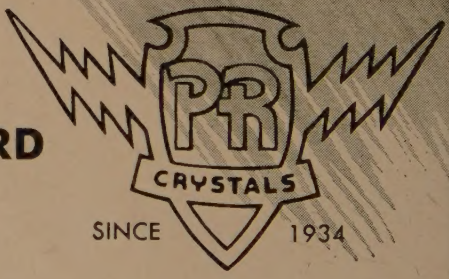
CQ

AUGUST 1953

RADIO AMATEURS' JOURNAL

35c

AIRCRAFT-MARINE
BROADCAST-POLICE
FIXED SERVICES
AMATEUR-DIATHERMY
FREQUENCY STANDARD
MOBILE-INDUSTRIAL



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EXPORT SALES ONLY: Royal National Company, Inc., 75 West Street, New York 6, N. Y., U. S. A.

CQ RADIO AMATEURS' JOURNAL

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Cover Photograph

Bob Kuehn, WOHKF demonstrates some of the techniques used in his feature article "Calling the Hidden Transmitter Hunters" scheduled for appearance in our next issue.

FEATURE ARTICLES

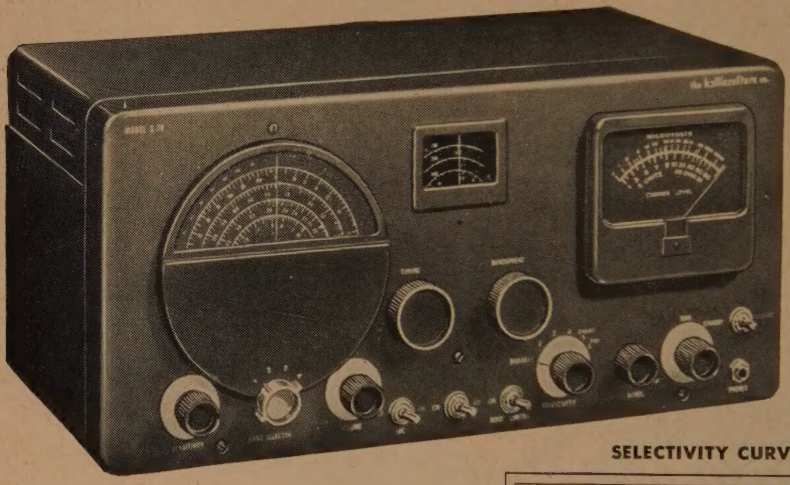
Departments

Miscellaneous

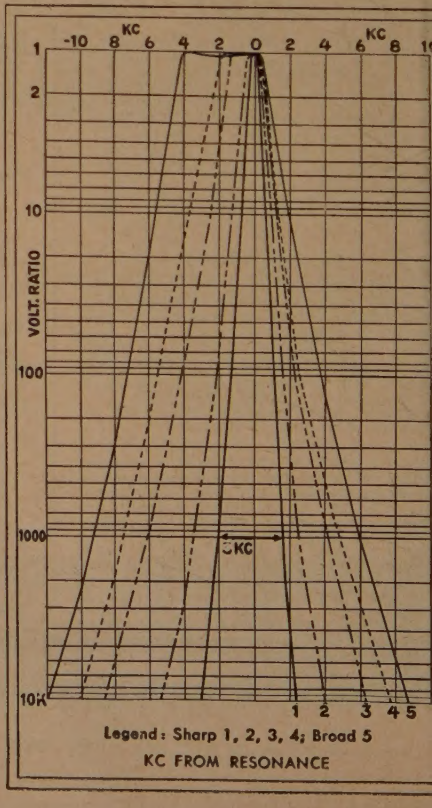
Check the specs...
Check the performance...

AND YOU'LL CHOOS

Do you know any better way, any other way, to judge SW equipment than to check the specifications and the performance? Frankly that's the only valid way we can think of to make sure you get your money's worth. Check these specs. Take a look at the selectivity curve for the S-76. It is typical of the outstanding value Hallicrafters offers in every price class.



SELECTIVITY CURVES, S-76



Model S-76

Double conversion receiver. Broadcast Band 538-1580 kc plus three short-wave bands covering 1720 kc-34 Mc.

Calibrated electrical bandspread for easy tuning. Double superhet with 50 kc second i-f and giant 4-inch "S" meter. Five position selectivity, one r-f, two conversion, two i-f stages, temperature compensated. 3.2 or 500 ohm outputs.

Satin black steel cabinet. 18½" x 8⅞" x 9½" deep. Nine tubes, plus voltage regulator and rectifier.

For 105/125 V. 50/60 cycle AC
Use R-46 speaker **$179.50**

hallicrafters

Model HT-20. T.V.I. suppressed 100 watt AM-CW transmitter with all spurious outputs above 40 Mc at least 90 db. below full rated output.

All stages metered; single meter with eight position meter switch; output tuning indication. Frequency range of 1.7 Mc to 31 Mc continuous on front panel control. Seven tubes plus five rectifiers.

For 105/125 V. 50/60 cycle AC. **$449.50**

Model SX-71. Covers Broadcast Band 535-1650 kc plus four short-wave bands covering 1650 kc-54 Mc and 46-56 Mc.

Built-in Narrow Band FM one r-f, two conversion, and three i-f stages. Temperature compensated, voltage regulated. Three watt output (terminals for 500 and 3.2 ohms).

Satin black steel cabinet. 18½" x 8⅞" x 12" deep. Eleven tubes plus regulator, rectifier.

For 105/125 V. 50/60 cycle AC. **$224.50**

Models S-40B, S-77A. Covers Broadcast Band 540-1680 kc plus three short-wave bands covering 1680 kc-44 Mc.

Electrical bandspread for easy tuning. One r-f, two i-f stages to draw in stations. Switches for automatic noise limiter, code reception and three-position tone control. CW pitch control and built-in speaker. Seven tubes plus rectifier.

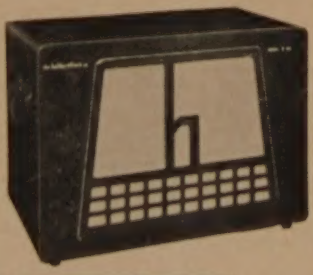
S-40B For 105/125 V. 50/60 cycle AC **$119.95**

S-77A Same, for 105/125 V. AC/DC

32 lbs. **$119.95**

Model R-46. Matching 10" PM speaker for use with Hallicrafters communications receivers SX-71, SX-76, SX-73 or SX-62. 80 to 5000 cycle range. Matching transformer with 500-ohm input. Speaker voice coil impedance, 3.2 ohms.

Satin black steel cabinet matches all Hallicrafters receivers. Cloth covered metal grille. 15" x 10⅞" x 10⅞" deep. Shipping weight 17 lbs. **$19.95**



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Feenix, A

Deer Hon Ed:

The gold rush are on. Easy monies are where finding it, and Scratchi are always smart gen fellows who willing to stuping over to picking same. Of course, Hon. Ed., I not speaking of gold. No of coursy, I speeking of money I mak do to TVI.

For long whiles not much TVI to worrying abo out here, on acct. of FCC freeze on TV stati But now that FCC licensing TV stations again, t popping up like gophers out of ground. Practik every day sum city here having grand opening, it being either for Sooper-Market or TV station.

Every time new tellyvision station cuming on amchoors here getting brand new set of complai The amchoors not bulleeving it but they hav joocy signals on UHF (Unyoushally High Freaken band. It are at this point that Scratchi stepping May I presenting my card:

> **Hashafisti Scratchi, D. B.**
> DeTVI'er Extrordinary
> Open 24 Hrs.
> Rates on Request

I passing out these cards at last amchoor meeting, and having instant suckcess. (What's t Hon. Ed., you asking what D. B. mean? Simple mean De Bugger!) I are getting so many jo almost working 24 hours per day. I are busier t a flee with flees.

Most of the jobs I getting are 1/c snaps. Amch who on me calling not having reel trubble—they to lazy finding out what cawsing TVI. You see Hon. Ed., I not reely fixing trubble, I just tel peeples how to getting rid of troubles. Boy oh b Scratchi are riding high through the clover pa That is, I are until my last job.

Guy cuming to me and telling me he having solvable TVI problem. Hah! I are telling him, n ing are unsolvable to geenyus likesame Scrat In fackly, I telling him if I are not solving trubble, he not even bothering to paying me. (I can losing on deal like that?) Also this amch are new novice, so I figuring I can nicking him only abouts five bux.

After I agreeing to taking job, he giving me downs. It are seeming that normally he not ha any TVI, but one naybor are raising hectic e Tewsday nite. When he checking, he finding cawsing TVI on Tewsday nite—and here are dutchman in the haystack—but only when one

(Continued on page 8)

(from page 6)

gram are on. Ah so! I figuring, this fellows are a little cracked in the anode cap. Nevermore, I are checking his story. Hardly to buleeve, but are true, Hon. Ed. On any nite but Tewsday, no trubbles at all. Howsomever, when Uncle Wiltie cuming on, ZAMMO! get TVI like furious.

This are a pretty kettle of stew. His rig are so shielded that even the electrons having to stooping over to get in. He having every antenna filter known to man. Howcomes then getting TVI?

Only reason that I keep trying to solving problem are that every time I visiting naybors house when Uncle Wiltie are on, I meeting fine old gentleman who cuming in to see program. He normally never there except when Uncle Wiltie on air. Well, he reely amoosing old gent. He knowing more stories than Uncle Wiltie—and better ones to.

Also, this old gentlemans are interested in radio. In fack, he telling me that he not liking the heering aid he buying, and he changing circuit to getting more gain. He telling me how he . . . Hackensaki! When I remembering this, wattmeter in Hon. Brain suddenly going off scale. Is it possible that . . . could it be he . . . do you think that . . . would the . . .? Hon. Ed., it surely could.

Next Tewsday I waiting till Uncle Wiltie program one, with bars all across picture, then I asking fine old gentleman to please turning off heering aid. Well, the f. o. g. did, and . . . no more TVI. I are exuberate. It seeming that f. o. g. had gotten heering aid so it oscillating, and that freakency beating against amchoors freakency cawsing nice set of TVI bars.

Well, that are one for the books. Scratchi's bank books, that is. Amchoor are pretty well heeled, and he forking over nice hunk of cabbage. Which are reminding me, Hon. Ed., are you thinking U. S. Steel or A. Tel. and Tel. are giving me best divvydends?

Respectively yours,
Hashafisti Scratchi

Present and Prophetic

Atlanta, Ga.

The Atlanta Radio Club will hold its annual Hamfest during August 30th at Robinson's Tropical Gardens near Atlanta, Georgia. They promise that everyone will have fun since they've scheduled a transmitter hunt, contests, and games for the XYL's and YL's. Quite a few prizes will be awarded, too, including Viking II and Elmac transmitters, and to top it all off, there'll be a meal of **fried chicken and free drinks**, all for the paltry sum of $3.00 per person—though you can get the kids in for $1.75. Send your reservations to Mr. Reagin Warren, W4RVH, 490 Angier Ave. NE., Apt. #3, Atlanta, Ga.

Akron, Ohio

The 7th Annual Ham Outing of the Buckeye Short Wave Radio Association will be held during August 30 on the site of the Happy Days Camp, at Virginia Kendall Park located just north of Akron on Route 303, 0.8 mile west of Route 8. There'll be prizes for both young and old. Registration will be held at two p.m., and the fee will be $2.00 per family. For more details, contact R. J. Nuss W8KDW, B.S.W.R.A. Secretary, Box 138, R.D. #1 Doylestown, Ohio.

Zero Bias . . .

ARRL Convention Address by Comm. George E. Sterling

On Friday, July 10th, Commissioner Sterling, W3DF gave an interesting and informative talk before the 1953 7th National ARRL Convention at the Hotel Shamrock, Houston, Texas. The following material is excerpted from the address and is self-explanatory:

"On the evening of June 12, 1953, I attended a meeting of the Rock Creek Amateur Association of Montgomery County, Maryland, and heard one of the most informative, straight-from-the-shoulder talks regarding amateur frequency allocations from one whom I consider is the best-informed individual in this country on this subject. The talk was given by Albert L. McIntosh, W3ZM, and Chief of the Commission's Frequency Allocations and Treaty Division of the Engineering Department.

"Had you been at that meeting you would have been impressed with Mr. McIntosh's historical and factual analysis of the frequency allocations between 1800 kc. and 30,000 kc. and their relation to the 75,- 40- and 20-meter amateur bands in the past, present and future.

"Your League officers are familiar with the story. Nevertheless, I believe every amateur who is interested in the survival of the amateur service, particularly as it relates to high-frequency operation, should become fully informed on this subject and keep alert to the day-by-day developments. We at the Commission level are familiar with the background of these allocations and realize the seriousness of the problem should the governments of the world engage in an Administrative Radio Conference. The longer such a conference is put off, the better it will be, in my opinion, for the amateur radio service. This breathing period should be used to advantage in preparing for the battle ahead.

"In the case of the 7 Mc. band, it was brought out that the United States chose at Cairo, 1938, and again at Atlantic City, 1947, to retain a full 300 kc. band for the amateur service in our region in preference to a smaller band which would be exclusively on a world-wide basis. For example, agreement could have been reached at Atlantic City to have band 7000-7200 and band 14000-14400 kc. exclusive amateur on a global basis. However, the United States preferred 300 kc. in the 7 Mc. band and, consequently, the broadcasting service has either a shared or exclusive allocation in other regions between 7100 and 7300 kc. Thus, there is only 100 kc. in the 7 Mc. band which is exclusively amateur throughout the world.

"In the 14 Mc. band, the United States chose at Atlantic City to maintain 350 kc. on a world-wide basis except for a fixed allocation to the USSR in the band 14250-14350, in preference to a 400 kc. band for the United States and extensive sharing of this band by the fixed service in other regions.

"The principal of frequency allocation which is involved in these two bands at 7 and 14 Mc. is whether we are better off with a world-wide exclusive allocation of somewhat smaller width or whether it is better to have a larger band for the United States with extensive sharing by other services in other parts of the world. These are points which every amateur with an interest in the future should study carefully so that when these problems arise again at future conferences we can have a sound position on the part of a United States delegation.

"The fixed service is now having very great difficulty in confining its operations in the reduced spectrum space allocated to it by the Atlantic City Conference. Mr. McIntosh showed that, for example, between 5950 and 7300 kc. the space available to the fixed service under the Cairo, 1938, allocations was 375 kc. Under the Atlantic City, 1947, allocations only 235 kc is allocated to the fixed service. One may conclude from his remarks that if a new international radio conference were held at the time it is quite apparent that the pressure on the 7 Mc. amateur band, due to the requirements of the fixed services, would require strong defense by those representing the amateur service.

"In my opinion, the foregoing leads us to a conclusion so obvious that no amateur, worth of the name, may overlook it. Frequencies represent the assets upon which our hobby lives. If these assets shrink to a critical point, amateur radio, as we know it, might disappear or be confined to operations above 28 Mc.

"The solution to this basic part of the amateur problem (and I believe, to most of the amateur problems) lies, to a very large degree, in promoting a full understanding in the amateur ranks of the problems of the amateur(s) as they relate to the problem of the other radio services and to the public generally. Only by this means can the best course of action for the amateur be decided."

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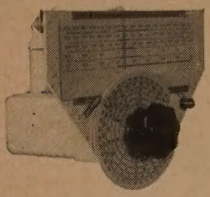

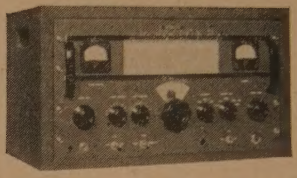

70E-8A Permeability Tuned Oscillator — The versatility, accuracy, stability and voltage coefficient that distinguish a good v.f.o. are standard in the 70E-8A. Every component is highest quality — meets strict specifications. 16 turns of the vernier dial cover the linear range of 1600 kc to 2000 kc. Use in exciter or measuring instruments for truly professional performance. You can depend on it to give you long service free from trouble.

32V-3 VFO Transmitter — A bandswitching, gang-tuned amateur transmitter. Rated at 150 watts input on CW, 120 watts phone, this little receiver-size rig has the kick of a kangaroo, and its excellent audio provides extraordinarily good readability. The 32V-3 covers the 80, 40, 20, 15, 11 and 10 meter ham bands. It is thoroughly filtered and shielded to minimize the possibility of TVI.

KW-1 Transmitter — Engineered for maximum power allowed by your license. Its input is a full 1000 watts on phone or CW. The entire transmitter, including power supply, is in one attractive cabinet. Complete bandswitching of the exciter, driver and power amplifier by a single control on the front panel. It covers all bands from 10 through 160. TVI reduction is accomplished by well engineered shielding and filtering. It's as easy to handle as a 32V-3.

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75A-3 Receiver — Makes use of the new Collins mechanical filter which represents an entirely new approach to the attainment of selectivity. The 75A-3 is a double conversion superheterodyne for top performance on the 160, 80, 40, 20, 15, 11 and 10 meter bands. Only the band in use is shown on the slide rule dial. The bandspread dial is accurately calibrated directly in kilocycles. Vernier zero set control on front panel.

35C-2 Low-Pass Filter — Designed to reduce harmonic radiation. Can be used with any 52-ohm-output transmitter though especially built for use with the Collins 32V-3. 35C-2 has coaxial fittings to make installation easy. Provides about 75 db attentuation at television frequencies with an insertion loss of only .18 db. The filter's three sections are individually shielded and the use of low-loss capacitors insures excellent performance under all conditions.

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COLLINS

COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St., NEW YORK 36 **1930 Hi-Line Drive, DALLAS 2** **2700 W. Olive Ave., BURBANK**

Front of amplifier. The chrome strips framing the glazed opening are Collins Radio Co., part #120 007 00. To take full advantage of the power-handling capabilities of the 4E27A/5-125B's, the right-hand meter should have a 500-ma. range.

A Modern 4E27A Final Amplifier

JAMES FREUND, W5QMI

c/o Collins Radio Co., 1937 Irving Blvd., Dallas 2, Texas

Besides describing an efficient, 3.5 to 30-Mc amplifier, capable of one kilowatt input on CW and over 600 watts on AM phone, this article re-introduces the versatile 4E27A/5-125B to the amateur designer. It is no secret that "high-voltage" tubes are not usually the most efficient things in the world at comparatively low plate voltages. With the 4E27A/5-125B, however, a plate-circuit efficiency of well over seventy per cent is easily attained at a plate voltage of only 1,000 volts. At the same time, none of the advantages of high-voltage operation have been sacrificed.—Editor

The development of efficient, multi-element, transmitting tubes has substantially eliminated the need for bulky, high-power driver stages in modern amateur transmitters. It was natural, therefore, to choose them when I planned my new transmitter.

My choice was the *Eimac* 4E27A/5-125B. It is a radial beam power pentode. It is probably the easiest tube in its power class to drive, requiring less than three watts of r-f driving power under any condition of operation. In general characteristics, the tube somewhat resembles the 4-125A. Both have a rated plate dissipation of 125 watts and an input of 500 watts on CW and 380 watts on AM, plate-modulated phone.

The most obvious difference between the two types is the suppressor grid in the 4E27A/5-125B. It seldom introduces circuit complications, because it is usually grounded. However, the suppressor grid does increase the versatility of the tube. For example, when the available plate voltage is limited (1,000 to 1,500 volts or so), a plate-circuit efficiency of over seventy per cent is obtained by applying sixty volts at a few milliamperes to the suppressor grid.

At all plate voltages, operating the suppressor grid slightly positive reduces the screen dissipation fifty to seventy-five per cent. At plate voltages ove 2,000 volts, this reduction is seldom thought wort the slightly-increased circuit complications re quired to apply the positive voltage to the suppre sor. Therefore, it is usually grounded.

Although the 4E27A/5-125B has a maximu screen voltage rating of 750 volts, there is litt point in operating it above 500 volts. This com pares with a "typical" screen voltage of 350 vol on the 4-125A. However, the 4E27A screen cu rent is usually considerably less (even with th suppressor grounded) than that of the 4-125A therefore actual power consumption is less.

The suppressor grid may also be used to am plitude modulate the 4E27A/5-125B. Under typic operating conditions, a carrier output power thirty-five watts is obtained with 1,500 volts the plate and seventy-five watts with 3,000 vol on the plate. In this type of operation, the su pressor is biased heavily negative and is not drive positive during any part of the modulation cycl As a result, no audio power, but only voltage, required to modulate the tube.

Compared to control-grid or screen grid modul tion, suppressor-grid modulation is somewhat easi to adjust, and modulation linearity is usually be ter. Plate-circuit efficiency is about the same any of them. Suppressor modulation would see to have its greatest application for the CW oper tor who wants to take an occasional "fling" phone without investing in modulating equipmer

Constructing The Amplifier

So much for the tubes themselves. How they a employed at W5QMI is shown by the circuit di gram, *Fig. 1,* and the several photographs. T

cuit is a conventional push-pull one, using a ld-switching coil turret in the grid circuit and ug-in coils in the plate circuit. The mechanical rout, however, is unusual.

Illustrated is the usual seventeen-inch chassis, one inches wide and 12 inches deep is used. Supple- inting the chassis is a 7 x 12 x ¾ inch piece of ote upon which the amplifier tank circuit is ounted. This arrangement affords several ad- ntages. Besides reducing the required panel ight by three inches, it automatically insulates e plate tuning condenser from ground, mak- it easy to connect the d-c plate voltage to it, ris permits the use of a condenser with a lower oltage rating than would otherwise be required. addition, the construction reduces the length of e connections between the condenser and the be caps.

The coil jack bar and swinging link assembly is bolted to the top of *C10*. *RFC1* is mounted between the two sections of *C10*, by means of a home-made bracket replacing the original mounting foot.

C9 is also mounted between the two sections of *C10*. It is fastened to the side wall of the chassis, with one of its terminals grounded to one of the mounting screws. The other terminal, plus the bottom lead of *RFC1* and the d-c high-voltage lead, connects to the center "grounding" lug of *C10*. The other end of *RFC1* connects to the jumper that joins the inner jacks on the coil jack bar.

Use wire as heavy as the heaviest used in any of the coils for the jumper and for the connections between the end jacks on the coil jack bar and the stators of *C10*. Connections between *C10* and the plate caps are made of flexible copper strips that terminate in *Eimac HR-5* heat-radiating connectors.

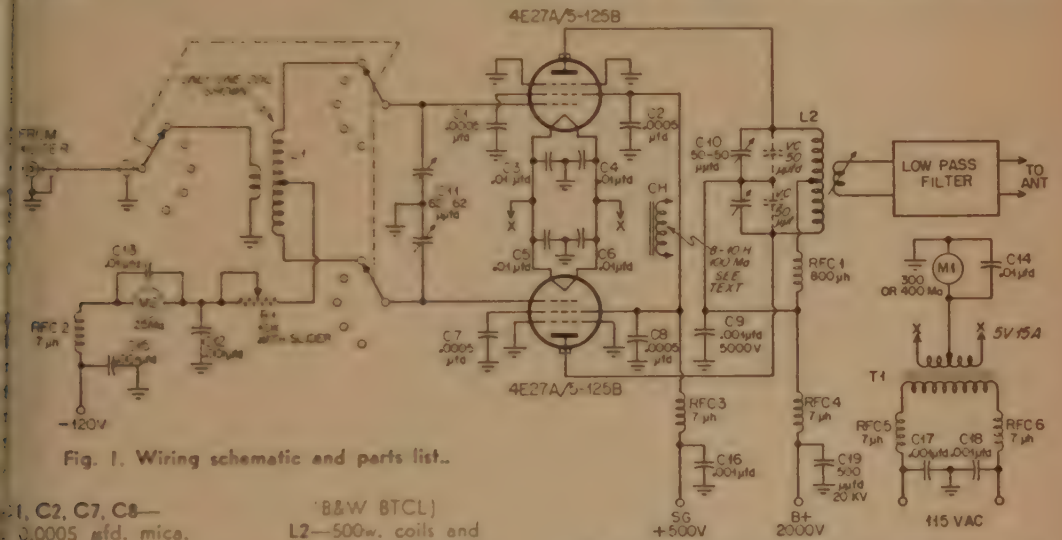


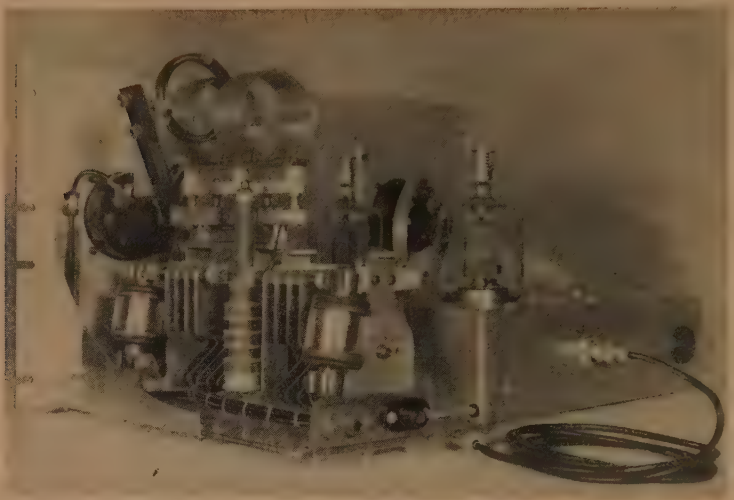
Fig. 1. Wiring schematic and parts list.

C1, C2, C7, C8—0.0005 µfd. mica, 7000wv.
C3, C4, C5, C6, C13, C14—0.01 µfd. mica.
C9—0.001 µfd. mica, 5000wv.
C10—50 µµfd. per section, 6,000 volt (National AMT-50D)
C11—62 µµfd. per section, "butterfly" condenser. (Hammarlund. Burstein-Applebee part No. 178313)
C12—0.001 µfd. mica
C15, C16, C17, C18—0.001 µµfd. ceramic.*
C19—500 µµfd., 20,000v. TV ceramic.*
V.C.—50 µµfd. vacuum condensers from BC-442B. (See text)
L1—35w. 3.5 to 30 Mc., centertapped, center-linked, coil turret. (B&W BTCL)
L2—500w. coils and plug-in swinging link assembly (B&W TVL series)
RFC1—800uh. r-f choke. (National R175)
RFC2, RFC3, RFC4, RFC5, RFC6—7uh., r-f chokes (Ohmite Z50)*
R1—10,000 ohms, 25w., with slider.
T1—5v. 15 a. filament transformer.
M1—500 Ma. milliammeter
M2—25Ma. milliameter
Tube sockets—Johnson #122-237 (specify type with ventilating hole)
Ch1—10h., 100ma. filter choke. See text
*These parts not used in original. Suggested for use in TV fringe areas.

The plug-in vacuum condensers will be recognized as coming from the *surplus BC-442A* antenna unit. If unobtainable, a standard 25-*µµfd*, 20,000 volt vacuum condenser directly across the stators of *C10* will give the same results.

A standard, 10 x 12 x 3-inch, aluminum chassis with a ten-inch side against the front panel, supports most of the remaining components. The tube sockets are submounted* on a *No-16* gauge aluminum bracket, measuring about 9 x 2½ x 1⅛-inches, to place the tops of the tube bases even with the top of the main chassis. The centers of the sockets are spaced six inches apart, and the bracket is mounted to place the centers of the sockets 2½ inches from the side of the chassis, with the front one about 3¼ inches behind the panel.

* This is a common practice, although, Eimac recommends flush mounting. As long as the metal base shell is grounded, submounting does not improve grid-to-plate circuit isolation, but does result in less efficient tube cooling, whether by convection or forced-air. These remarks are not intended to condemn W5QMI's construction—his amplifier has given trouble-free service for well over a year. The manufacturer's recommendations should be considered, however, when the tubes are to be operated at or near their maximum ratings.—Editor



The amplifier ready for 3 Mc operation. The vacu condensers across each e of the tank condenser fifty $\mu\mu$fd. condensers fr surplus BC-442A anten units. See text for ad tional details about the The high-voltage conn tors behind the tuning c denser are the plate screen-voltage input t minals.

Two and one-half inch diameter holes in the chassis permit plugging the tubes into the sockets. Spring-brass fingers ground the metal base shells as the tubes are plugged in.

In wiring the tube sockets, 0.01 μfd condensers bypass each filament terminal, and 0.0005-μfd condensers bypass each screen terminal. The usual precautions should be taken to keep the leads short.

The suppressor-grid terminals are grounded, because at 2,000 volts, plate-circuit efficiency is not decreased appreciably by doing so, although the screen current is increased slightly over what it would be if the suppressors were biased positive.

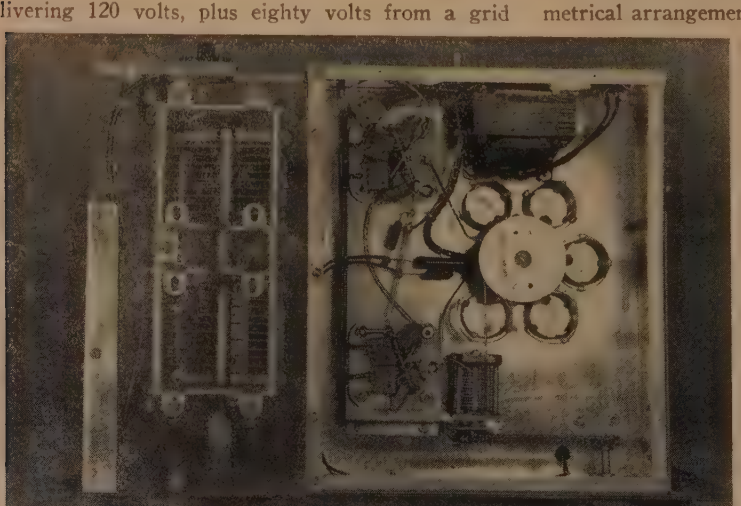
The control-grid coil turret is centered in the space to the right of the tube sockets. The filament transformer is behind it, and *C11*, the grid tuning condenser, is beside the front tube socket. Use heavy conductors to connect *C11* to the turret and the turret to the control grid of each tube. A length of *RG-59/U*, coaxial cable carries the grid excitation from the connector on the rear of the chassis to the turret.

Bias voltage is obtained from a bias pack delivering 120 volts, plus eighty volts from a grid resistor. As the grid current varies under diff ent modes of operation, the resistor should ha a slider to permit adjusting the bias voltage the correct value.

Neutralization of the inter-electrode capacities the tubes has not been found necessary for sta operation of the amplifier on any band.

Some may question the operating convenience not having either the grid turret or the outp link controlled from the front panel. This intr duces no complications. The amplifier is the t deck in a three-foot rack cabinet with a hinged t door. At the same time that the tank coil changed through this door, it is a simple matter turn the turret to the proper position, plug in different link (if necessary), and set it for t desired coupling.

The panel is a standard aluminum, 19 x 12 inch with a 4 x 6-inch, glazed cutout for viewi the tubes. The plate and grid meters flank the c out. Below them are the knobs that control t plate and grid condensers. To obtain this sy metrical arrangement, I used a pair of *Boston Ge*



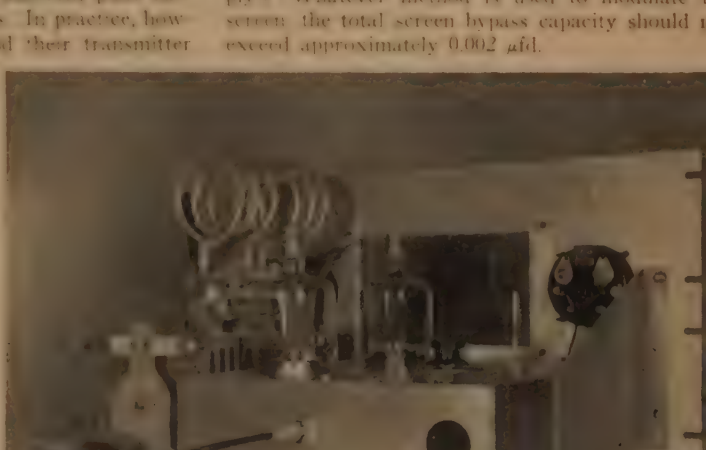
Bottom of the 4E27A a plifier. Since this pict was taken, fixed resistan R1, has been replaced w one with a slider, and mica condenser beside has been removed. A the return lead from now goes to the po plug. The midget varia condenser over the terminal of the front t socket and the mica c denser to the screen-v age tie point in the corner of the chassis mementoes of some ea experiments.

Company, No CB 1 L2 sprockets and ladder chain No. 1A to couple the grid condenser to its knob. The plate condenser is driven through a pair of *Boston* gears, giving a five-to-one step-down ratio between knob and condenser shaft.

Similar gears and sprockets can be obtained from distributors throughout the country. For the record, however, I obtained mine from the *George I. Fox Co.*, 2412 Commerce St., Dallas, Texas.

A rigid, insulated shaft coupling is used between the shaft of *C1a* and the gear to prevent grounding the high-voltage power supply. This coupling must be well insulated, especially for phone operation, because the voltage across the coupling doubles on modulation peaks. The panel drive shafts are standard ¼-inch panel bushing assemblies.

To eliminate the danger of having the plate voltage on the front panel, the plate-current meter, *M1*, is placed in the cathode circuit. Admittedly, this is a nuisance when widely different plate currents are drawn at various times. In practice, however, most amateurs try to hold their transmitter input to a predetermined level. Under these circumstances, by connecting a milliameter temporarily in the screen circuit when tuning up and noting the actual readings on *M1* and *M2* at the desired input, subsequent tuning adjustments will consist of duplicating the original readings on both meters. The plate and screen currents will then be the desired values, within a few milliamperes.



Ready for 28 Mc. The bottom cover, upon which the amplifier is resting, and the double screening over the panel window were added to clean up some minor TVI observed when the amplifier was first put into operation. A low-pass filter in the output leads completed the de-TVI-ing job.

Power Input

Power input at W5QMI is limited to 400 or 500 watts, because that is all the input my modulator is capable of handling. The power is obtained at a plate voltage of 2000 volts and a plate current of 200 to 250 milliamperes. Plate current can be increased to 320 milliamperes on phone and 400 milliamperes on CW, without exceeding the ratings of the tubes. Higher plate voltages would also be permissible on CW. On phone, however, the plate condenser would probably arc over on modulation peaks at much higher voltages.

With phone inputs of up to 500 watts to the two tubes, no overheating has been evident. At high inputs more air circulation might be desirable. A blower forcing air into the chassis through a screened hole will do the job. The bottom plate of the chassis will channel the air through the ventilating holes in the tube bases, thereby effectively cooling the tube seals. Without a blower, a number of screened holes in the sides of the chassis and in the bottom plate will improve cooling.

Modulation

For 100 per cent modulation, the screens of the 4E27A's must be modulated simultaneously with the plates. To do so, I feed the screen voltage through a screen-modulating winding on the modulation transformer. Lacking such a winding, equal results can be obtained by feeding the fixed screen voltage through a ten-henry, 100 ma choke, or by obtaining the screen voltage through a dropping resistor from the *unmodulated* high-voltage supply.[1] Whatever method is used to modulate the screen, the total screen bypass capacity should not exceed approximately 0.002 μfd.

TVI

When the amplifier was first placed in operation mild TVI was caused on local channels (4, 5, and 8) on some bands. This was eliminated when the amplifier was in the cabinet by placing a copper screen over the inside and outside of the front panel viewing port, putting the bottom cover on the chassis and adding a low pass filter in series with the output link.

In fringe areas, additional TVI precautions may be required such as lead filtering, as indicated in *Fig. 1*, and shielding of the meters.

Any exciter capable of delivering five watts of r-f power to the grids of the 4E27A's may be used as a driver. I use a *Collins* 310B, which is keyed for CW operation.

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[1] If the screen voltage is obtained through a resistor from the high-voltage supply, some method of preventing the screen voltage from soaring during key-up periods of c-w operation should be incorporated in the screen circuit. **Editor.**

A Simple, Efficient Station-Control System

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Though WN8JDR's flexible station-control system utilizes no startling new principles, if you have to manipulate a couple of switches during QSO's or are crowded for space, we think you will find it worthy of your attention—Editor.

For quite some time, I have wanted a master control panel and system for my shack. I just couldn't think of a good location for it, however, and I was always bumping my head while peeking around corners and under tables to see if the various tubes were really lit.

One night, while waiting for the XYL to finish putting up her hair, I was casually paging through the *Handbook* and came across the suggestion that the main tuning control of the station receiver should be four to eight inches above the table for maximum operating convenience. I raced up to the shack. Sure enough, the main knob on my receiver was a skimpy three inches above the table.

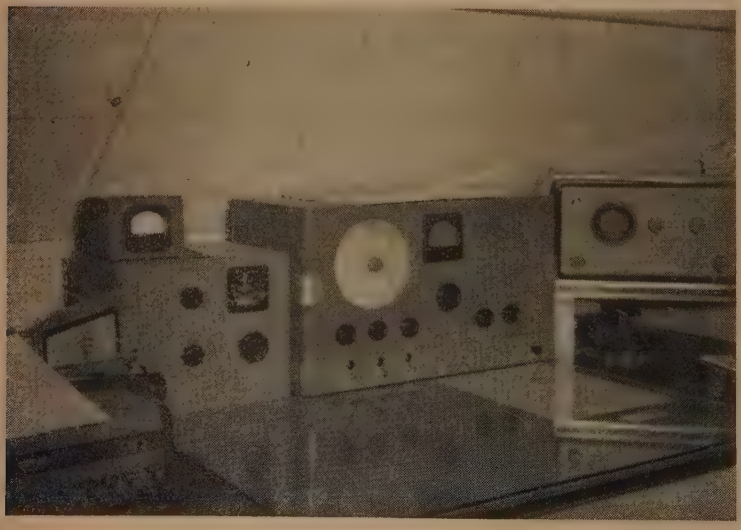
The pieces began to fit together. If I jacked up the receiver a bit, it would be easier to tune, and I would have room for that control panel. Furthermore, the controls would be located in the most logical place; right in front of operating position.

By the time the XYL was asleep, I was busy with paper and pencil. Let me see. What did I want to control? Filaments. Plate power for the oscillator. Plate power for the amplifier. And, as I like being on good terms with the rest of the gang, I wanted to be able to turn on the oscillator alone for frequency spotting. I wanted single-switch operation during QSO's. And, as it is against the law to be a Novice forever, I expect to have a VFO and a modulator someday; therefore I decided to include provision for them both so that I would not have to build a new control panel when making an addition to the station. Finally, I wanted indicator lamps on all primary circuits.

Construction

Once I had decided what I wanted, the rest was as easy as finding WWV on 10 Mc. The wiring diagram and photograph show the finished product. The dimensions of the box depend on the size of the receiver and how much you want to raise it. Mine is 9¼ x 18½ x 1¾ inches, which puts the tuning knob of the *S-20* about 4½ inches above the table. It consists of two pieces of aluminum screwed to a pair of ¾-inch white pine sides (1 x 2-inch stock). The wooden sides support the weight of the receiver.

Double-pole, single-throw switches take care of



WN8JDR's attractive control panel, mounted under his receiver. The black knob on right of the panel is the send-receive switch. Note how conveniently it is placed in reference to the key.

the interlocking problem nicely. One half of *S1* controls the power applied to the *Filament* receptacle, while the other half is in series with *S2*. One half of *S2* controls power to the *Oscillator* receptacle and the other half is in series with *S3*, half of which controls power to the *Amplifier* receptacle. The remaining half of *S3* controls an indicator lamp, as will be explained later.

Now I have a good interlocking switch system. The first switch must be on before the second one will operate, and the second one must be on before the third will operate. There will be no electrons flying around loose in my shack just because I'm shooting 500 volts at my 807 without first lighting its filament.

In my shack I key the final amplifier and use a cathode keying resistance. The relay with its coil in series with the oscillator plate current lead to operate the antenna and receiver-disabling relays. This made the *Send-Spot-Receiver* circuit easy. A lever-action, s.p.d.t. neutral-center switch, with a spring return on the *Spot* side (*Centralab 1467*) does the job. Its center terminal goes to the B+ terminal of the oscillator power supply. The terminal on the *Send* side feeds the oscillator through the relay winding, and the one on the *Spot* side bypasses the relay winding.

The rest of the wiring is pretty straightforward. Another d.p.s.t. switch is the *Phone-CW* switch. One half of it controls power to the *Modulator* receptacle while the other half loafs along just closing the key circuit in the *Phone* position. (*Don't forget to provide some method for shorting out the secondary of the modulation transformer while on CW; it may save the transformer*—Editor.)

Oddly enough, the indicator lamps gave me the biggest headache. Originally, I had planned on using neon bulbs, wired in parallel with the power sockets. They lit all right but they were not bright enough to be seen through the jewelled pilot-light assemblies I had purchased. Regular, 117-volt pilot lamps were bright enough, but they would not fit in the allotted space, so I dug up a couple of filament transformers from the junk box and did the job with 6.3-volt pilot bulbs.

The primary of the first transformer is connected across the *filament* receptacle, with a pilot bulb across its secondary. The second transformer and bulb are similarly connected in the *Oscillator* circuit. Running out of transformers, I then connected the third bulb in series with the unused section of *S3* across the secondary of the first transformer.

Although this system works fine, I'd still recommend neon bulbs, connected as indicated in the diagram.

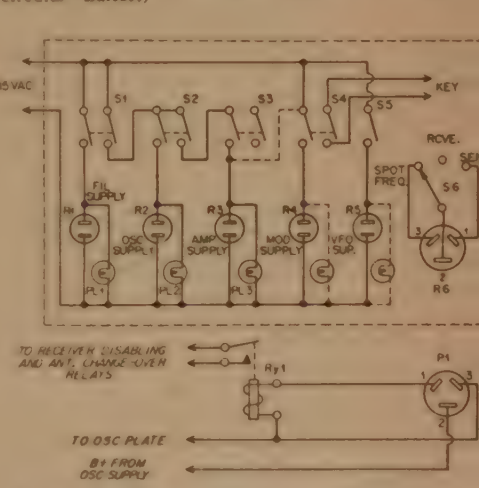
It was a simple matter, after the wiring was completed, to lift the receiver while the XYL slid the control box into place. Then I plugged the power supplies into the appropriate receptacles, and was all ready to go.

Operation

In operation, the filament switch is first snapped on; then, after a thirty-second pause, the *Oscillator* and *Amplifier* switches.* Then all switching is normal operation is controlled by the *Send-Receive* switch. In the neutral, center position, the B- lead of the oscillator is broken and the receiver *Standby* circuit is completed through a set of normally-closed relay contacts. In the *Send* position, the oscillator plate current flows through the control-relay winding, de-activating the receiver and switching the antenna from it to the transmitter. In the *Spot* position, the oscillator goes on and that is all.

All in all, I am pretty happy with the new setup and I think it is worth passing on to others who are cramped for space and are not running a "full gallon." As a matter of fact, the thing is so flexible that it could control the "gallon" through 117-volt a-c relays. HMMmmn . . . Where did I put those 304TL's?

* This sequence of operation assumes that all filament transformers are independent of the plate power supplies. Most low-powered transmitters utilize combination plate-and-filament transformers, with the d-c output circuit of the power supply broken during "Standby" periods. To achieve the same results under these conditions it will be required that S2 and S3 control 117-volt, a-c relays with their contacts in the B-supply circuits.—Editor.)



NOTE—DOTTED LINE FROM S3 TO S4 SHOWS ALTERNATE CONNECTION FOR INTERLOCKING MODULATOR SUPPLY.

S1, S2, S3, S4—bat-handle DPST toggle switches (3 amp., 125v.)
S5—bat-handle SPST toggle switch (3 amp., 125v.)
S6—Centralab type 1467, 2 pole, 4 position positive and spring return
R1, R2, R3, R4, R5—2 pole, female receptacles (Amphenol type 61-F1)
R6—3 pole, female receptacle (Amphenol type 60-F1)
P1—3 pole male plug (Amphenol type 60-M)
PL1, PL2, PL3—neon bulb pilot lights
Ry1—d-c "plate circuit" relay (surplus)

Fig. 1. Schematic and parts list for the station control unit. The interlocking system prevents many inadvertent tragedies from occurring.

DX and the SUN

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In part one the author outlined the factors which govern the intensity of ultraviolet radiation from the sun, and how these factors affect the density of ionization of our upper atmosphere, and, ultimately, the characteristics of radio-frequency propagation. In part two W2PAJ explains the phenomenon of ionospheric absorption, and gives us a comprehensive rundown of expected propagation conditions for the next few years.—Editor.

Part II

Ionospheric Absorption

So far we have discussed only the characteristics of the ionosphere as a reflector of radio waves. The ionosphere, besides reflecting signals, can also act as an absorbing agent upon the signal. Ionospheric absorption is one of the factors that causes a reduction in signal strength during a shortwave transmission.

As a radio wave enters the ionosphere, it imparts energy to the ions that exist in this region. These ions are set into motion by this energy and convey the radio wave through the layers of the ionosphere. While moving through the ionosphere, these ions may collide with the much heavier gas molecules that are also present in this region. During such collisions the ions loose some of the energy originally imparted to them by the radio wave. In effect, this lost energy decreases the strength of the radio wave. The degree of absorption generally depends upon the number of collisions made per second, which is a function of the transmission frequency, and also upon the degree of ionization. Since the degree of ionization varies with solar activity, the absorption of high frequency radio waves also varies throughout the solar cycle.

During the years of minimum solar activity, when the degree of ionization is at its lowest values, ionospheric absorption is also at a minimum. During the next few years, therefore, signal intensities on frequencies that are reflected by the ionosphere should be stronger than they were on similar circuits during the years of considerable solar activity. In other words, although high-frequency DX conditions in general may continue to become poorer during the next few years, there may be certain instances when conditions *may actually improve* because of decreased absorption and resulting stronger signals.

General Propagation Conditions 1953-1956:

The sunspot cycle can be used as an index of general DX prospects. During the years of maximum solar activity, DX conditions are generally at their best, while during the years of minimum solar activity, high-frequency DX may be poorest.

We have already discussed some of the characteristics associated with the present period of minimum solar activity and we will now determine what effects these characteristics may have upon shortwave radio conditions during the next few years, particularly upon the various amateur shortwave bands.

Ten Meters:

We are now quite certain that the highest usable frequencies for a particular circuit will continue to decrease for the next few years. While the six-meter band may have been usable on some DX circuits during the year of peak solar activity, it is very likely that even the ten-meter band will be too high for consistent DX during the years of minimum sunspot activity. No easterly-westerly paths (for example, U.S.A. to Europe or the Far East) will be possible on ten. In fact, except for some very spotty openings to South America during the daytime hours of the Fall, Winter and early Spring months, ten meters will probably be completely devoid of DX. This band will be most useful for local QSO's while sporadic-E (short-skip), especially during December and the Summer months, will permit contacts up to distances of about 1,250 miles.

Fifteen Meters:

This band is also quite susceptible to changes in solar activity. DX possibilities will be greatly reduced but some daytime DX should be possible on fifteen meters throughout the late Fall, Winter and early Spring months. Openings will be spotty, often occurring with considerable fading. The band may open on a small percentage of the days to Europe and Africa. More frequent openings, including the Summer months, may be possible from all areas of the U.S.A. to Latin America, and from the Western U.S.A. to the Pacific islands and Oceania. In general, DX will be possible on this band, but rather erratic and for only short periods during certain months.

Twenty Meters:

While decreasing solar activity will have its effects on twenty-meter DX, this band will probably be the least affected of the high-frequency daytime bands. Usable frequencies will still be high enough to permit some openings on twenty meters to almost all parts of the world. However, the number of hours that the band will remain open will be considerably less during the next two years than for corresponding periods during sunspot maximum. For example, during December, 1947, twenty meters was usable from the East Coast U.S.A. to Europe from about 0530 hours EST to 1700 hours EST, a period of at least 11½ hours. During December, 1952, this circuit was usable for about 9 hours a day, while during the winter months of the next few years, it is expected to open for less than five hours a day. This general trend will be noticed on all circuits on this band throughout the year. Although twenty meters will no longer remain a DX band around the clock, it will be the only daytime band upon which consistent year round DX will be possible.

Previously it was mentioned that during a sunspot minimum the MUF for a particular circuit is about one-half the value observed during sunspot maximum. In effect this means that during the next few years, twenty meters in many respects will behave quite a bit like ten meters did during 1947-49. It will remain a good daytime DX band, but with little or no activity during the night-time hours.

Forty Meters:

Here also the same general pattern prevails—this band is now and will for the next few years continue behaving quite differently, than it did a few years ago. The changes, however, although certainly noticeable, are not as extreme as they are on the higher frequency bands.

Night-time DX should still be possible on forty. Circuits to Latin America, Australasia and South Africa are expected to hold up quite well, right through the minimum, during all but possibly the Summer months. During the night-time hours of the Summer months conditions to Europe should be fairly good, and DX also possible to many areas of the Far East. During the winter months, the MUF on these more or less east-west circuits will go below seven megacycles and conditions will be quite erratic with the band dropping out most of the night.

Because of lower ionospheric absorption, the forty-meter band is expected to open earlier in the afternoon, and stay open later in the morning than in previous years, especially throughout the Winter months. This effect has already been noticed, with British stations being heard in New York City, during January of 1953, as early as 1400 hours EST and as late as 0500 hours EST.

In many respects, night-time DX conditions on forty meters for the next few years will somewhat resemble night-time conditions on twenty meters during the past few years. DX should be possible throughout the night in the late Spring, Summer and Fall months and during the late afternoon, early evening, and early morning hours in the Winter and early Spring months. During the Winter months, DX conditions during the night will be erratic and generally poor to most areas of the world, except Latin America.

On shorter paths, changing conditions will also be noticed, with the general skip pattern increasing in distance. During the years of considerable sunspot activity, forty meter skip would be as short as, or shorter than, 100 miles for a good part of the day. During the next few years the skip will get considerably longer, with near in stations heard for only short periods in the late afternoon and as evening approaches, the skip distance will increase considerably, especially during the Winter months. In general, for distances up to about 2,500 miles, the day and night skip characteristics on forty meters during the next few years will be very similar to that of twenty meters during the years of sunspot maximum.

As during other years throughout the sunspot cycles, daytime DX will generally not be possible on forty meters. However, as explained previously, signal strengths will be stronger because of decreased absorption, and DX signals should start breaking through earlier than during previous years.

Eighty Meters:

Conditions on eighty meters during the years of minimum solar activity may be quite interesting. This frequency range is low enough so that the depression of usable frequencies associated with decreased solar activity does not affect this band. In other words, the MUF, even during the years of sunspot minimum, does not usually drop below 4 Mc. Therefore, DX possibilities on 80 meters *do not* get poorer with decreased solar activity. This is quite in contrast to the changes that occur on the higher frequency amateur bands. In fact, there is very good reason to believe that DX conditions on eighty meters are improving and will continue to improve during the next few years.

During the years of considerable sunspot activity, ionospheric absorption severely attenuates eighty-meter DX signals. Since ionospheric absorption is on the decrease, eighty-meter signals should be stronger than in previous years, and night-time DX possibilities should improve considerably on this band during the next few years, especially during the Winter months, when seasonal ionospheric absorption is also at its lowest values.

During the Fall, Winter and Spring months, it should be possible to work night-time DX to almost all areas of the world. Stronger signals than in previous years are expected to be heard from Latin America, Europe and Australasia, with circuits also possible to the Far East and Africa.

During the Summer months, higher atmospheric noise levels and seasonally higher ionospheric absorption will limit DX possibilities on eighty meters.

For shorter paths up to 2,500 miles, the skip on eighty will also lengthen, especially during the night hours of the winter months. Generally, conditions on eighty meters during the next few years will be

(Continued on page 59)

Getting Started on Single Sideband

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Part V of the Single Sideband Series is a continuation of Part IV presented last month. The discussion on linear amplifiers is carried through simple procedures for practical amplifiers, and makes use of the sample design in an amplifier utilizing the type 6146 tubes.

Part V

What Tubes ?

Here is where you can always find someone to argue with. Everyone has their pet tubes that they swear by. This author is no exception. I will attempt to subdue some of my biased (regulated, that is) views, but I hope you will pardon me if an uncontrolled opinion sneaks in occasionally.

There are several schools of thought on the tube matter. There are the two basic divisions, tetrodes versus triodes. Then in the triode class there are again two main groups of adherents: (1) those who prefer the zero bias tubes with their freedom from biasing troubles and severe swamping requirements, and (2) those who prefer to use the low-mu triodes with their high bias requirements so that high power may be obtained without going into the grid current region at all.

Each has its advantages and disadvantages. The zero-bias tubes will give higher stage efficiency grid current to grid current region since it draws (about 70%), there is no sharp transition from no-grid current as soon as even a small amount of grid excitation is applied. It will load the driver heavier at higher levels, but the sharp transient is missing and less swamping is needed than where a heavily biased tube is driven into the grid current region. The zero-bias stage is reasonably free of intermodulation distortion when properly operated.

The low-mu tube operating in class AB1 requires practically no driving power, but will require a fairly high grid voltage swing in order to drive the tube to its full capabilities. The distortion products from this type of operation are very low—almost as low as class A operation. The only possibilities for trouble would be in the tube characteristic itself or in improper loading or drive as explained earlier. The stage efficiency is lower (50 to 55%) but that is the price you pay for a cleaner signal. It is my own opinion that a clean signal is to be desired even at the expense of total output power.

There is of course the middle ground in this matter, the tube that requires some value of grid bias that is driven into the grid current region for just a portion of the grid excitation cycle. This is the baby that you have to swamp heavily to give good grid signal-voltage regulation. This "middle ground" case unfortunately is not a compromise from the standpoint of distortion. Generally, it has more severe distortion present in the output than either of the previously mentioned triode cases.

This brings us to the next major class of tubes—tetrodes and pentodes. These, too, have their advantages and disadvantages. Their chief advantage is in the low driving power requirements and relatively low grid signal voltage required for full output. One of the chief objections to using the larger tetrodes is the necessity of a stiff regulated screen power supply. Ordinary voltage regulator

Synopsis

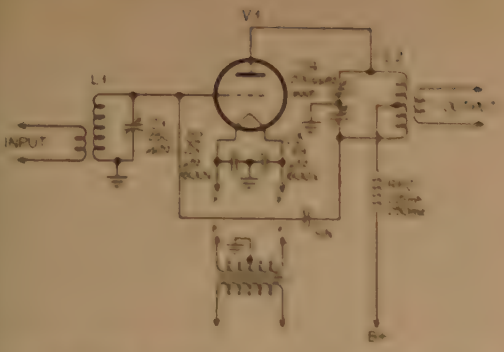
Part 1 (Mar. '53 CQ): Basic SSB theory, two practical receiving adaptors described.

Part II (Apr. '53 CQ): The filter method explained, practical crystal filter exciter described, using the mechanical filter in a transmitter.

Part III (June '53 CQ): The phasing method explained, description of W9DYV's Multiphase exciter.

Part IV (July '53 CQ): General discussion of linear amplifiers.

Mobile Issue (May '53 CQ): Complete description of a 50-watt mobile SSB transmitter.



C1—250 μμfd. variable
C2, C3—
C4—
transmitting
condenser.
CN—
Condenser—value depends on inter-electrode capacity of tube used.
RFC—2.5 mh. 250 ma.
V1—Zero-bias tube such as 811, 805, TZ40, etc.

Fig. 2. Grounded-cathode linear amplifier. This is a conventional circuit using zero-bias tube as shown in Fig. 1.

tubes (VR-150, VR-105, etc.) will be suitable for many tubes while others will require the full treatment. This means that an electronically regulated supply using 6L6's, 6Y6's, or 6AS7's must be considered as a short regulated arrangement using a small transmitting tube and dropping resistor from the plate supply as suggested by W2AZW[1]. The shape of the tube characteristic curves will probably have more effect on the distortion products in the output than anything else—if the circuit voltages are according to Hoyle. There are some tubes that just aren't suitable for use as linear amplifiers.

What Circuits?

Here again everyone has their own preference. We shall try to review briefly what the various possibilities are. The two obvious general classes of circuits used are: (1) grounded grid, and (2) grounded cathode amplifiers. The grounded-grid amplifiers have some very attractive features. There is generally no tuned circuit needed for the input of the stage. There is no neutralization needed in the case of triodes, therefore the plate tank circuit can be single-ended, that is, no split-stator condenser and center-tapped coil. If zero-bias tubes are used this further simplifies the problem. See *Fig. 1* for an example of what can be done—note the minimum of parts needed. So much for the advantages, and now for the disadvantages.

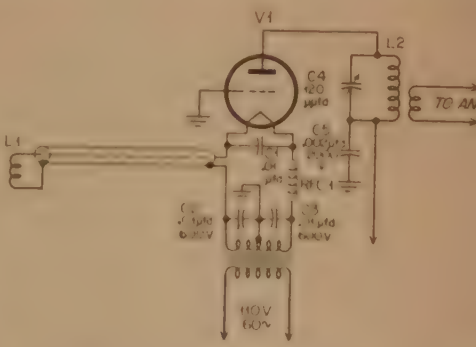
Grounded-grid operation will require considerably more drive than use of the same tube in the conventional grounded cathode arrangement. This extra drive is not lost, however. It appears in the output circuit of the final amplifier as useful output.

1. "On the Air with Single Sideband," QST, Jan., 1953, p. 46.

It is possible to get output power from a grounded-grid stage that is greater than the d input to the plate circuit of the amplifier. Th would make the *apparent* efficiency greater th 100%. As mentioned this is because the *drivi* power appears as *output* power. Don't get a ideas now—the FCC has taken care of what you a thinking about with the amateur regulations regar ing grounded-grid operation. Another point to ke in mind is that tetrodes cannot be used successfu in grounded-grid service because the presence the screen grid will tend to make the circuit osc late at signal frequency. Most pentodes also ca not be used for this reason because the isolati provided by the suppressor grid is not usua enough to prevent self-oscillation. Still anoth point—never use a grounded-grid stage as driver stage where the *driven* stage reflects changing load back into the grounded-grid sta because this changing load will in turn be reflect back one stage more into the driver's driver. Co fusing, isn't it? Confusing or not, the results a bad—more distortion than is healthy.

Again referring to *Fig. 1,* you will notice that filament choke is necessary to keep the filam transformer capacity to ground from shunting t r-f driving voltage. The other alternative to usi a choke or tuned circuit in the filament wiring is procure a special low-capacity filament transform that some of the surplus radar sets were bless with.

Coming now to the more familiar grounde cathode amplifiers we find circuits that we ha been using for years in class C stages. See *Figure* There is really nothing new about the actual c cuits. It is only the operating voltages on t control grid and the amounts and kind of drivi signals that are different in linear amplifiers. T conditions that go to make a *good* class C amplif



C1, C2, C3—0.01 μfd., 600v. disc ceramic
C4—120 μμfd., single section variable air condenser.
C5—0.002 μfd., 2000v. mica
RFC1—50 turns #1 enamel wire on 1" form.
V1—Any zero-bias tube—811, 805, TZ40, etc.
r-f chake.

Fig. 1. Grounded-grid linear amplifier. Zero-bias tubes such as 811's or 805's work nicely in this arrangement.

Fig. 3. 'Scope pattern showing SSB transmitter output r-f envelope during "two-tone test." Make it look like this! No serious non-linearity problem here.

are the same that help to make a good linear amplifier. By these I mean good tank circuit *Q*, freedom from oscillation and parasitic oscillations, good mechanical lay-out and construction, and so on. As outlined earlier the stage may be operated in various modes of linear operation. The driving power is generally modest and can be furnished by either of the exciters described in *Part II* or *Part III* of this series.

Design Considerations

Don't turn the page now! I'm not going off the deep end and try to frighten you. You don't have to be a "slide rule artist" to perform some of the essential design calculations for an amplifier. I do not intend to give a complete design procedure for you to follow. I feel that this has been already done in an excellent simply-worded article by Reque.[2] In this article, W2FZW tells how to design circuits and select operating voltages for tubes for which no class B ratings are given. This applies only to a few tubes, fortunately, so our job is simpler.

If you will consult the tube manuals you will generally find that the audio ratings for a tube are given for class A, AB1, AB2, and class B. We merely transfer our operation into the r-f realm and we are on our way—almost! In audio work we are accustomed to ordering a transformer that properly matches the tube grid impedance and likewise the plate impedance to whatever load we are using. We can't be quite as glib as this in r-f service. We have to choose our tuned circuits with discretion in order to accomplish the same end.

Let us take a specific example and work through it and end up with some answers that we can put to work for us. For the low-power boys let us choose the 6146 pentode that has made such a hit. The table below is extracted from the RCA tube manual for the 6146 in audio service (two tubes).

Table 1 tells quite a story. The triode connected ratings were listed just for your information. You can appreciate the advantages of pentode connected operation without any trouble.

You must now make up your mind as to the details of the final product. These include: number of tubes, series or parallel operation of tubes, class of operation. Let us say for the sake of argument that we want to use two 6146 tubes in some sort of linear amplifier. Consulting *Table 1* we see that pentode connection in AB1 will give us 120 watts output while AB2 operation will give only 10 watts more—130 watts. Since AB2 operation involves operating the tubes partially in the grid current region with all of its attendant troubles we would be wise to choose class AB1 and sacrifice the 10 watts of output. Since we have chosen the class AB1 mode of operation, the design of the grid tank circuit becomes no problem at all. Our only problem now is to furnish the grids with sufficient voltage to swing them throughout their full range—100 volts peak-to-peak for tubes in push-pull. If the exciter is a little puny on output and you think that getting the 100 volts is going to be a problem use this approach. Employ link coupling between the exciter tank and the final grid circuit and put a higher *L* to *C* ratio tank circuit in the grid circuit than you have in the exciter output tank. This will give you a voltage step-up as in an ordinary transformer. The resonant impedance of the grid tank will be higher accordingly but this is perfectly OK since the grid draws no current and appears as a very high impedance itself. *Note:* The 100 volts grid swing needed was for push-pull operation. This means if only one tube is used the drive needed is 50 volts peak. The same is true if the tubes are operated in parallel—only 50 volts.

Next is the design of the plate tank circuit. Remember, we said that we wanted a loaded *Q* of

2. "Linear R. F. Amplifiers," Reque, **QST**, May, 1949, p. 15.

TABLE I

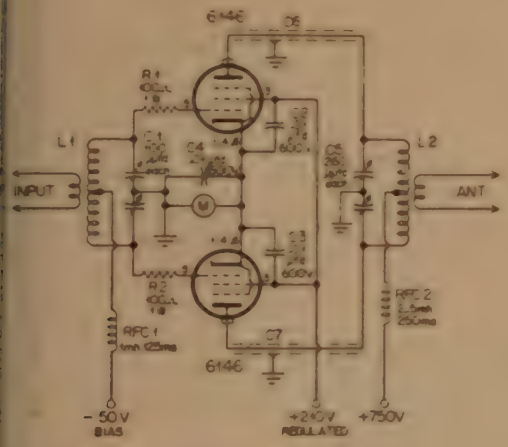
Audio ratings for type 6146 tube (two tubes used.)—From RCA Tube Handbook.

ICAS Ratings	Class AB1 (triode connected)	Class AB1 (pentode)	Class AB2 (pentode)
d-c plate voltage	400 v.	750 v.	750 v.
d-c grid #1 voltage	-100 v.	-50 v.	-45 v.
peak AF grid-to-grid v.	200 v.	100 v.	101 v.
d-c grid #2 (screen) v.	-----	200 v.	165 v.
zero signal screen current	-----	1 ma.	0.6 ma.
max. signal screen current	-----	27.5 ma.	21 ma.
zero signal d-c plate current	80 ma.	57 ma.	35 ma.
max. signal d-c plate current	136 ma.	227 ma.	240 ma.
effective load (plate-to-plate)	8000 ohms	8000 ohms	8000 ohms
max. signal driving power	0 watts	0 watts	0.03 watts
max. signal output (approx)	19 watts	120 watts	130 watts

tween 12 and 15. Keep this in mind. Every tube for a given set of operating voltages has a plate resistance that depends on the swing of the a-c plate signal voltage and the swing of the plate a-c signal current. Lucky us! We don't have to worry about calculating this value because the tube manufacturers have been kind enough to do it for us. In the case of the 6146 tubes in push-pull the plate load resistance is 8000 ohms. For one tube it would be 4000 ohms. (Note: For class A single-tube service and small variation in plate current of tubes in AB1 service, the single-tube plate load resistance would be 4000 ohms. However, for large variation AB1 operation, such as the 6146 and for full class B operation, the single tube must look into a load one-quarter that of two tubes in push-pull.) From these values of load resistance, the desired circuit Q (12 to 15) and the operating frequency we can

$$\text{Reactance (in ohms)} = \frac{\text{plate load resistance required}}{\text{loaded circuit Q}}$$

arrive at the values of tank capacity and tank inductance to use. The formula to use is very simple and is as follows:



R1, R2—100 ohms, 1w. carbon (parasitic suppressor)

C1—100 μμfd. per section split stator condenser, receiver spacing.

C2, C3, C4, C8, C9, C10, C11—0.01 μfd., 600v. disc ceramic

C5—260 μμfd. per section condenser (Cardwell MR-260-BD)

C6, C7—coaxial condensers made from 6" of RG 58/U or RG 59/U (shield grounded)

RFC1—1mh. 125ma. r-f choke

RFC2—2.5 mh., 250ma. r-f choke

M—300ma. DC milliammeter

Fig. 6. Class AB1 linear amplifier using 6146 tubes, capable of 120 watts output at voltage shown.

Fig. 4. "Two-tone test" pattern showing peak flattening caused by too much drive, poor driver signal-regulation, antenna loading too light (see text).

The reactance is the inductive reactance or capacitive reactance that the coil and condenser will have at resonance. *Note:* Inductive reactance is equal to capacitive reactance at resonance.

For our two tubes in push-pull:

$$\text{Reactance} = \frac{8000}{15} = 533 \text{ ohms}$$

With this value of reactance we substitute it in the following formulas:

$$\text{C (in ufd.)} = \frac{1}{6.28 \times \text{freq.} \times X_C}$$

$$\text{L (in microhenries)} = \frac{X_L}{6.28 \times \text{freq.}}$$

where freq. is in *megacycles*
and $X_c = X_L = 533$ ohms (already determined)
For the 4.0 megacycle band:

$$C = \frac{1}{6.28 \times 4.0 \times 533} = 0.000075 \text{ ufd.}$$
(or 75 ufd.)

$$L = \frac{533}{6.28 \times 4.0} = 21.2 \text{ microhenries}$$

That was simple, no? This means that we will have an *effective* tank capacity of 75 μμfd. or a split-stator condenser with 150 μμfd. per section *in use*. For the practical transmitter we would use a 200 μμfd. or a 220 μμfd. per section split-stator condenser in order to cover the entire band.

Someone is bound to ask "Why not use the tubes in parallel and avoid the use of a split-stator condenser and a center-tapped coil?" This idea is OK, but the appropriate changes must be made in our tank *L* and *C* values. Since the plate load resistance of a single 6146 tube is 2000 ohms, two tubes connected in parallel will yield 1000 ohms. You can stick this value in the above formulas, and you will find that the tank circuit capacity has increased by a factor of 8, now being 600 μμfd. instead of the 75 μμfd. for push-pull service. Wow! That's a lot of tank condenser in any man's transmitter. We must point out that we could fudge a little on this figure in the downward direction to 480 μμfd. by changing the operating *Q* to the lower limit of 12. This is still a man-sized capacitor, but not impossible to obtain.

Parallel operation has likewise changed the size of our tank coil. It is now ⅛ of its former inductance—now being 2.6 microhenries. This means that

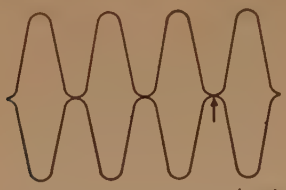


Fig. 5. "Two-tone test" pattern showing sloppy cross-over characteristics (shown by arrow). Grid bias voltage should be reduced until cross-over is sharp "X", as in fig. 3.

Coil Table

(Figure 1)

L1—Link coil on driver stage output.
L2—Plate tank coil for particular band in use.

(Figure 2)

L1—Grid Tank coil. Tuned by C1 to amateur band in use.
L2—Center-tapped plate tank coil tuned by C5 to amateur band in use.

(Figure 6)

L1—Grid coil. For 80 meter operation use B & W 80MCL, for 40 meter use 40MCL, etc.
L2—Plate coil. For 80 meter operation use B & W Type B80BVL with turns removed from both ends so that condenser C5 is 2/3 meshed at 4.0 mc., etc. For 40 meters use 40BVL and 1/3 meshed condenser at 7.3 mc.

(Figure 7)

L1—Grid tank coil, end linked.
80 meters—B & W 80MEL.
40 meters—B & W 40MEL.
L2, L3—Parasitic choke. 10 turns #22 enamel wound on R3 and R4.
L4—Plate Tank Coil.
80 meters—B & W 20BEL.
40 meters—B & W 15BEL.

if you are in the habit of buying commercial wound coils, for the *parallel-connected* case you should purchase a 20-meter coil and use it on 80 meters. Even in the push-pull case turns must be removed from the standard 80-meter *B&W* coil in order to attain the proper *L* to *C* ratio.

You are now forced to make a decision as to which to use—push-pull or parallel. I think that you will agree that the push-pull connection is slightly more attractive because of the prohibitive size of tank condenser used in the parallel case. It is a matter of personal preference—as the man says, "You pays your money and you takes your chances."

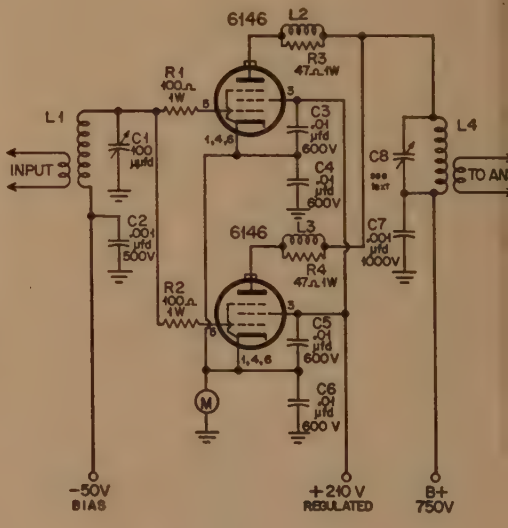
This business about the proper *L* and *C* values isn't just so much bunk. If the basic rules are followed the tubes will run cooler, the maximum power will be transferred to the antenna, the harmonics will be down—in other words things will be running more efficiently.

Two Tone Tests

You hear SSB operators talking glibly about "two-tone tests." They are referring to the simple test that can be performed on a SSB transmitting system to check the linearity of the amplifiers. W must have some yard stick with which to chec our amplifiers that have so "carefully" been d signed and constructed. The idea is briefly this Feed two steady sine-wave audio signals into th SSB exciter input. You can use two audio osci lators, or you can inject carrier and feed just on tone into the microphone input. The amplitude these two signals should be kept equal for th tests. Those using the phasing exciter describe in *Part III* can feed one tone into the microphon input and put the function switch in the AM pos tion and leave the carrier balanced out. This wi produce a double-sideband "two-tone" output.

Now, what to look for. Connect a 'scope to th output of the last amplifier after approximating th proper loading with a *dummy load*—never into a antenna except for short tests, puleeze! Set th sweep rate on the 'scope for 20 to 30 sweeps pe second. If both signals of our two-tone test ar equal we should see a pattern that resembles tha in *Fig. 3.* This is the way the pattern should loo if everything is operating properly. Increase th

(Continued on page 62)



C1—100 μμfd. single section on air variable (Cardwell ZR-100-AS)
C2—0.001 μfd., 500v. mica
C3, C4, C5, C6—0.01 μfd., 600v. disc ceramic
C7—0.001 μfd., 1000v. mica
C8—Cardwell MR-260-BD dual sectio transmitting condenser with both sections tied in parallel.
R1, R2—100, 1w. carbon
R3, R4—47 ohms, 1w. carbon
M—0-300ma. DC milliammeter

Fig. 7. Parallel-connected 6146 class AB1 amplifier, also capable of 120 watts output. Note difference in plate-tank L-C ratio when compared to fig. 6.

The Monitoring Post

Starting in the October issue we will be printing several pages of "Monitoring Post" material. The very favorable response afforded the "Monitoring Post" as a result of the June editorial has shown that the items in this column are among those read first in each issue of CQ.

Send your notes, club bulletins, etc. to The Monitoring Post Editor, CQ Magazine, 67 West 44th Street, New York 36, N. Y.

—Editor

Huntley, Montana, is famous for two things. They are "da mayor," Earl Mead, W7LCM, and the world's largest dog catching department. Movie stars, politicians, generals, admirals, business tycoons are certified Huntley Dog Catchers.

Being a purely political appointment, "pull is necessary to become a Dog Catcher. His Honor considers no application, unless accompanied by a letter of recommendation from a "big shot."

W6MU got his appointment upon the recommendation of Jack Kirkwood, W2ZOW was vouched for by the Chief of Police, New York City. Bob Hope was sponsored by Dorothy Lamour. Bob, in turn, sponsored the mayor of San Francisco.

Dorothy Lamour later requested an appointment for herself. Earl was adamant in his refusal to make her a Dog Catcher, until she obtained a letter, outlining her qualifications. Political honesty paid off. After receiving her certificate, Dorothy sent Earl an autographed picture in appreciation for being put in the "doggy set."

If you aspire to high political office, "da mayor" will be willing to consider your appointment to his staff, but don't forget that letter of recommendation. "No pull, no job."

The rumor started by a jealous rival mayor that Huntley does not have a dog pound should not be taken too seriously, merely because it is true.

Bob Hope proving that his boss, Earl Mead, W7LCM, the "Mayor" of Huntley, Montana, made no mistake in appointing him Dog Catcher.

CQ's 1952 WORLD-WIDE DX CONTEST

HERB BECKER, W6QD

DX Contest Editor

Once again the World-Wide DX Contest apparently appeals to the "dyed-in-the-wool" DX man. Each year the participation increases in spite of what some fellows felt were poor conditions in 1952. One thing about DX contests; most of the men appear ready for action whether conditions are good or bad. For a few years, right after the war ended, everyone worked so much DX and with so little effort, that I am afraid a great many became, shall we say, spoiled. It is true that you can really knock them off when there are some favorable openings on the various bands, but on the other hand you might be able to test your operating skill (or perhaps a better word would be patience), if you were to have poor conditions once in a while.

It makes us feel pretty good to hear all of the favorable comments from you boys who have participated, and I would like to have all of you know that we really do digest your comments, such as those that were sent in along with the contest logs. I will say, however, that after reading over the suggestions pro and con on the 1952 logs, it appears we will have an easy job, since very few of you suggested any changes at all.

Now, let's get to what we are all interested in—the results. First, let's look into the multiple operators' stations. The highest in this section was TA3AA with 327,988 points. The operators were W6OME and W1VQG. The second highest multiple operators' station was W8WZ with 238,368. W8WZ and W8ZY did the work. In third place W6AM with 223,210. The boys who helped him out were W6HX, W6BXL and W6QMC.

Other multiple operators' scores were W7DL with KL7UM 100,734. OZ2PA assisted by OZ4KX, and OZ3QA 119,695. KA2OM with WØCWX wound up with 102,090. Of course, we can't forget our DX Ed KV4AA, who, helped by KV4BC, ran up 178,976. It appears the activity in this multiple operators' section is becoming more popular; the boys entered in this section seem to get a great deal more enjoyment than they used to when they were going it alone. Apparently their association with other operators gives them a lift, but I suppose what that really means is that it's good to have another operator around to crack you in the back of the neck if you start to fall asleep.

Now let's have a quick rundown on the single operator's stations. For those that are statistically minded, I think that a few of the following figures will be of interest, i.e., the highest single operator all band score in the world was 4X4RE with 577,250. Close on his heels was 4X4BX with 422,676. Then we have a pack of them fairly close together including: CE3AG—335,434; KP4JE—284,055; ZS6OW—283,712; KH6IJ—283,094; W8JIN highest in U.S.A. with 215,259; ZE3JP—210,960; FF8AG—207,276; and VP9BF—183,080.

By looking below at the columns of figures you will notice certain ones in certain areas such as: W1RY—132,310; W2WZ—140,697; W3GRF—106,050; and W6DFY—109,509. Not far behind are: W6EPZ with 91,856; W6IBD with 89,037, and W7PGX with 83,968. In the ninth district we found a few pretty closely bunched: W9PKW—72,625; W9NDA—69,576; W9RQM—65,772; W9HUZ—57,040, and WØDAE, high in his district, with 65,685. The scores of the boys in the single band, single operator section look very intriguing. Top spot in the world goes to 5A3TU (now W6PCS again) with 104,130. This was done on 14 MC. Next we see W6BAX with 86,736, followed by KG4AF 84,843, G2LB with 71,526, and W3JTC 63,112. All of these fellows concentrated on 14 MC.

Before you read too far, take a quick look at the fine European participation. Those boys really turned

W8WZ grabbed his pal, W8ZY, and came up with the second highest multiple operators' score in the world with 233,368. These two fellows never seem to wear out, and for a couple of young fossils we think it is pretty terrific. Doc, W8WZ, is on the left, while Karl, W8ZY, wearing cans, is on the right. W8WZ runs a KW into a pair of 250TH's. The receiver is 75A2.

out. For that matter, we think the world-wide participation was very very good, but would like to see more of it from Oceania.

Once again I would like to thank members of the Southern California DX Club who did all the contest log checking and tabulation of scores. This was done under the general guidance of W6IBD together with W6DFY, W6FSJ, and of course, W6ENV. As I have said many times before, there is a terrific amount of detail work connected with one of these contests, and somebody must do the job. Without the help from the above fellows it would have been impossible to print the scores at this time. We are sorry that we were so late in getting out the certificates for the 1951 contest, but we will guarantee much better results for the 1952 certificates. They should be in the mail by the time you read the scores in this issue.

5A3TU (now W6PCS again) had the highest single band score in the world, 14 Mc., with 104,130 points. Jerry used a BC-610 transmitter with roughly 150 watts input. This low power was due mostly to the poor line regulation. The receiver a BC-342.

Countries in which there has been only one participant will show the score under the All-Band section only. Certificates will be awarded in accordance with the Contest rules and those stations receiving certificates are shown in bold face type.

Multiple Operator Stations

Scoring method, from left to right: station—zones—countries—total score.

United States

All Bands	W2LYO (W2FXZ)	9—	17—	1,040
All Bands	W6AM W6HX	80—	141—	223,210 W6BXL W6QMC
3.5 Mc.	W6AM	8—	9—	612
7 Mc.	W6AM	22—	41—	17,892
14 Mc.	W6RRQ (W6NIG)	27—	71—	68,796 W6MHB
	W6AM	27—	65—	49,772
	W6EAE (W6VDG)	23—	58—	43,416
21 Mc.	W6AM	14—	17—	9,317
28 Mc.	W6AM	9—	9—	756
All Bands	W7DL (KL7UM)	58—	105—	100,734
All Bands	W8WZ (W8ZY)	80—	168—	238,368
	W8DUS (W8UPN)	51—	72—	39,606 W8RAE
3.5 Mc.	W8WZ	10—	15—	1,575
	W8DUS	3—	2—	15
7 Mc.	W8WZ	23—	47—	18,270
	W8DUS	10—	15—	1,575
14 Mc.	W8WZ	25—	69—	38,164
	W8DUS	17—	30—	8,969
21 Mc.	W8WZ	18—	35—	10,865
	W8DUS	17—	30—	8,969
28 Mc.	W8DUS	5—	5—	225
	W8WZ	4—	2—	36
All Bands	W9DWD (W9DDP, JJO, MYC, GEM)	45—	59—	27,456
All Bands	WØAIW	61—	91—	74,936

Australia

All Bands	VK2ANN (G3DCU)	41—	93—	10,689 (G2BQC)

Bermuda

All Bands	VP9BG (2)	20—	30—	40,050

Chile

All Bands	CE3HL (CE3RE)	20—	22—	16,968

Czechoslovakia

7 Mc.	OK3OBK (OK3OFF)	6—	19—	1,300

Denmark

All Bands	OZ2FA (OZ4KX)	51—	134—	119,695 (OZ3QA)

England

All Bands	G2BOZ (G3HCT)	42—	121—	64,711
	G3HTW (G3ITP)	13—	122—	8,856
3.5 Mc.	G2BOZ	6—	30—	3,096
7 Mc.	G2BOZ	12—	40—	7,072
	G3HTW	4—	10—	322
14 Mc.	G2BOZ	18—	40—	8,400
	G3HTW	9—	25—	3,366
21 Mc.	G2BOZ	8—	11—	870

Guam

All Bands	KG6FAB (W6APM) (W6FXR) (KG6ADY)	31—	25—	44,016 (W7PLI) (KG6ADX) (KG6AFF)
7 Mc.	KG6FAB	14—	11—	8,575
14 Mc.	KG6FAB	17—	14—	13,713
	KG6ACZ (KG6ADI)	12—	14—	1,534 (KG6ADH)

Japan

All Bands	KA2OM (WØCWX)	31—	52—	102,090

New Zealand

All Bands	ZL4KB (ZL4DV)	20—	21—	3,895
3.5 Mc.	ZL4KB	3—	3—	12
7 Mc.	ZL4KB	7—	6—	351
14 Mc.	ZL4DV (ZL4KB)	14—	18—	3,648
	ZL4KB	6—	7—	572
21 Mc.	ZL4KB	4—	5—	198

Sweden

All Bands	SL5CB (SM5BKH) (SM5APU)	24—	55—	14,694 (SM5AFC) (SM5BBS)

Poland

All Bands	SP5KAB (SP5UX)	19—	66—	23,715
	SP9KAA (SP9KJ)	24—	58—	15,744
3.5 Mc.	SP5KAB	4—	15—	1,083
	SP9KAA	3—	8—	88
7 Mc.	SP5KAB	7—	27—	3,672
	SP9KAA	6—	18—	1,032
14 Mc.	SP9KAA	16—	34—	6,900
	SP5KAB	8—	24—	3,648

Turkey

All Bands	TA3AA (W6OME/TA3)	44—	123—	327,988 (W1VQG)

Virgin Islands

All Bands	KV4AA (KV4BC)	48—	88—	178,976

Single Operator Stations

North America

United States

All Bands	W1RY	69—	133—	132,310
	W1ODW	40—	62—	17,748
	W1ZD	30—	45—	13,725
	W1DHO	17—	37—	9,774
	W1APA	12—	16—	1,260
3.5 Mc.	W1RY	9—	11—	1,100
	W1RWP	6—	10—	592
	W1ODW	4—	6—	60
7 Mc.	W1DIT	22—	42—	9,729
	W1RY	17—	32—	5,292
	W1ODW	8—	14—	572
	W1DHO	5—	6—	187
	W1APA	5—	5—	160
	W1ZD	3—	4—	42
14 Mc.	W1RY	20—	48—	13,736
	W1DSF	16—	40—	8,064
	W1DHO	12—	31—	7,052
	W1RNQ	14—	30—	6,600
	W1ODW	11—	21—	2,080
	W1APA	7—	11—	522

Single Operator Stations

North America

	W1ZD	9—	11—	380
	W1NLM	8—	9—	306
	W1ODW	**12—**	**17—**	**1,624**
	W1OW	**12—**	**17—**	**1,624**
	W1ZD	**14—**	**27—**	**6,109**
28 Mc.	**W1RY**	**6—**	**6—**	**240**
	W1ODW	**5—**	**4—**	**189**
	W1ZD	**4—**	**3—**	**63**
All Bands	**W2WZ**	**67—**	**126—**	**140,697**
	W2JT	**24—**	**66—**	**40,320**
	W2EQS	**50—**	**74—**	**29,016**
	W2GNQ	39—	65—	28,080
	W2CWK	22—	39—	10,797
	W2CJM	17—	35—	7,592
	W2DTT	29—	34—	5,917
	W2QJM	29—	39—	5,916
	W2BO	16—	24—	3,480
21 Mc.	**W2WZ**	**14—**	**26—**	**7,965**
	W2EQS	**14—**	**19—**	**2,574**
	W2GNQ	**15—**	**10—**	**1,500**
	W2QJM	12—	16—	1,148
	W2EYZ	3—	5—	120
28 Mc.	**W2DJT**	**8—**	**8—**	**528**
	W2WZ	**7—**	**6—**	**221**
	W2GNQ	**4—**	**4—**	**96**
All Bands	**W3GRF**	**62—**	**113—**	**106,050**
	W3MFW	**45—**	**89—**	**55,208**
	W3AOO	**39—**	**87—**	**47,250**
	W3LXE	45—	80—	40,750
	W3ADZ	14—	20—	2,006
	W3QOR	9—	12—	376
3.5 Mc.	**W3GRF**	**9—**	**10—**	**551**
	W3LXE	**4—**	**5—**	**72**
	W3AOO	**3—**	**4—**	**49**

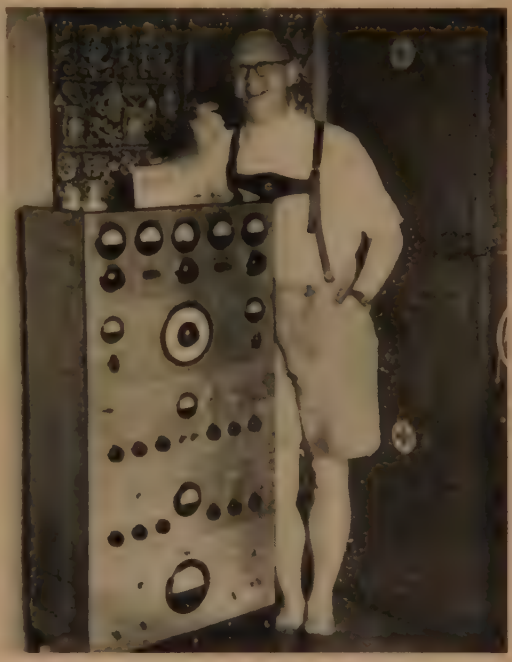
Chile's high scorer, Luis M. Desmaras, CE3AG, who rolled up an impressive all-band total of 335,434 points. Receiver is a Collins 75A-2, the transmitter can run a cool kw. into a 304TL final, and a 3-el. rotary for 10 and 20, plus a long wire for 15, 40 and 80 meters, completes the equipment lineup.

	W2KTF	19—	30—	3,381
3.5 Mc.	**W2EQS**	**8—**	**10—**	**558**
	W2DJT	**7—**	**9—**	**352**
	W2WZ	**7—**	**9—**	**272**
7 Mc.	**W2WZ**	**19—**	**33—**	**6,136**
	W2WC	**18—**	**32—**	**5,550**
	W2EQS	**15—**	**18—**	**2,013**
	W2GNQ	9—	12—	756
	W2BO	8—	10—	594
	W2QJM	9—	13—	528
	W2KTF	7—	11—	342
	W2JT	7—	7—	322
	W2CDP	5—	8—	156
	W2CJM	4—	6—	100
	W2CWK	3—	4—	56
14 Mc.	**W2JT**	**24—**	**66—**	**32,590**
	W2WZ	**20—**	**52—**	**29,952**
	W2CDP	**15—**	**37—**	**6,884**
	W2CWK	14—	27—	6,068
	W2CJM	13—	29—	5,712
	K2BU	18—	29—	5,405
	W2HSZ	13—	28—	5,289
	W2TXB	16—	30—	4,876
	W2EQS	12—	26—	3,192
	W2DJT	12—	17—	1,218
	W2BO	8—	14—	1,188
	W2KTF	12—	19—	950
	W2QJM	8—	10—	396
	W2HAZ	4—	4—	56
	W3MFW	2—	2—	8
7 Mc.	**W3AOO**	**19—**	**35—**	**7,182**
	W3GRF	**17—**	**28—**	**4,230**
	W3JTK	**18—**	**30—**	**4,128**
	W3LXE	15—	26—	2,665
	W3HH	12—	15—	1,161
	W3MFW	11—	15—	1,144
	W3QOR	3—	3—	18
	W3ADZ	2—	2—	8
14 Mc.	**W3JTC**	**25—**	**67—**	**63,112**
	W3GRF	**21—**	**58—**	**34,049**
	W3MFW	**20—**	**51—**	**18,034**
	W3LXE	20—	43—	15,372
	W3AOO	17—	48—	15,275
	W3DKT	19—	44—	10,773
	W3WQ	20—	28—	4,464
	W3ADZ	12—	18—	1,710
	W3QOR	6—	9—	225
	W3SNY	7—	6—	143
21 Mc.	**W3AYS**	**15—**	**21—**	**11,696**
	W3MFW	**12—**	**21—**	**3,696**
	W3GRF	**13—**	**15—**	**1,260**
	W3LXE	3—	3—	18
28 Mc.	**W3LXE**	**3—**	**3—**	**36**
	W3GRF	**2—**	**2—**	**28**
All Bands	**W4DQH**	**53—**	**92—**	**68,588**
	W4KE	**53—**	**76—**	**42,312**
	W4KFC	**36—**	**67—**	**39,243**
	W4SAT	**36—**	**57—**	**14,043**
	W4HQN	23—	44—	14,070
	W4TRA	30—	45—	11,025
	W4DRK	9—	11—	520
3.5 Mc.	**W4KFC**	**13—**	**19—**	**3,200**
	W4DQH	**8—**	**9—**	**510**
	W4SAT	**4—**	**5—**	**54**
	W4KE	4—	4—	40
	W4HQN	1—	1—	6
7 Mc.	**W4KFC**	**23—**	**48—**	**20,232**
	W4HQN	**19—**	**40—**	**11,977**
	W4DQH	**16—**	**27—**	**6,536**
	W4SAT	17—	23—	2,360
	W4KE	14—	18—	1,440
	W4TRA	14—	16—	1,140
14 Mc.	**W4DQH**	**19—**	**46—**	**23,290**
	W4LVV	**22—**	**48—**	**17,710**
	W4SAT	**15—**	**29—**	**3,784**
	W4KE	14—	18—	1,440
	W4TRA	10—	23—	2,972
	W4DRK	5—	7—	192
	W4USM	5—	6—	66
	W4HQN	2—	2—	16
21 Mc.	**W4KRR**	**17—**	**32—**	**8,624**
	W4COK	**18—**	**32—**	**6,650**
	W4KE	**12—**	**12—**	**864**
	W4DQH	4—	4—	48
28 Mc.	**W4TRA**	**6—**	**6—**	**300**
	W4DQH	**6—**	**6—**	**264**
	W4DRK	**4—**	**4—**	**80**
	W4KE	4—	2—	6
All Bands	**W5FNA**	**5—**	**91—**	**60,006**
	W5DQV	**53—**	**77—**	**43,160**
	W5CKY	**39—**	**74—**	**25,990**
	W5KC	44—	57—	18,483
	W5VIR	2—	29—	4,029
3.5 Mc.	**W5CKY**	**4—**	**6—**	**60**
	W5KC	**3—**	**3—**	**30**
	W5DQV	**3—**	**3—**	**12**
7 Mc.	**W5FNA**	**16—**	**24—**	**4,920**
	W5KC	**18—**	**26—**	**3,784**
	W5CKY	**14—**	**25—**	**2,808**
	W5FWA	14—	20—	2,754
	W5DQV	13—	18—	1,767
	W5VIR	1—	1—	2
14 Mc.	**W5DQV**	**22—**	**36—**	**10,998**
	W5FNA	**22—**	**38—**	**9,720**
	W5CKY	**20—**	**42—**	**9,362**
	W5KC	15—	22—	2,220
	W5VIR	12—	18—	1,680
21 Mc.	**W5FNA**	**17—**	**29—**	**5,796**
	W5DQV	**13—**	**18—**	**2,708**
	W5VIR	**6—**	**7—**	**169**
	W5VRI	4—	4—	80
28 Mc.	**W5KC**	**8—**	**6—**	**568**
	W5LFQ	**6—**	**5—**	**143**
	W5VIR	**3—**	**3—**	**54**
	W5VRI	2—	2—	36
	W5DQV	2—	2—	16
All Bands	**W6DFY**	**67—**	**106—**	**109,509**
	W6EPZ	**61—**	**98—**	**91,856**
	W6IBD	**38—**	**79—**	**89,037**
	W6SRF	45—	69—	57,684
	W6BUD	41—	68—	45,889
	W6ATO	44—	66—	43,010
	W6NZW	38—	65—	38,110
	W6VE	37—	57—	35,626
	W6BJU	45—	63—	33,136
	W6MUR	39—	61—	33,100
	W6BYH	46—	55—	25,381
	W6ALQ	32—	46—	21,606
	W6QD	33—	48—	19,197
	W6GWQ	35—	41—	17,480
	W6QDE	25—	34—	11,269
	W6LMZ	23—	32—	7,590
	W6CAE	19—	25—	4,972
	W6PBI	23—	26—	3,479
	W6EJA	14—	19—	3,168
	W6OKK	20—	20—	3,160
3.5 Mc.	**W6ZAT**	**11—**	**14—**	**1,552**
	W6EPZ	**6—**	**5—**	**231**
	W6BYH	**5—**	**4—**	**117**
	W6VE	2—	3—	45
	W6BUD	4—	4—	40
	W6PBI	3—	3—	36
	W6BJU	2—	3—	20
	W6CAE	1—	1—	6
7 Mc	**W6DFY**	**27—**	**48—**	**24,750**
	W6RW	**21—**	**37—**	**11,832**
	W6MUR	**20—**	**31—**	**10,200**

Single Operator Stations

North America

W6EPZ	18	31	9,261	
W6NZW	14	25	5,754	
W6BUD	15	21	4,104	
W6ATO	14	20	3,546	
W6ALQ	12	18	2,925	
W6QD	12	17	2,175	
W6SRF	12	15	2,154	
W6BJU	13	17	1,950	14 Mc.
W6BYH	11	12	1,386	
W6VE	5	8	1,235	
W6GWQ	11	12	1,196	
W6HHD	11	11	1,144	
W6QDE	6	7	403	
W6OKK	8	7	375	
W6EJA	4	6	370	
W6AE	1	1	6	
W6SAX	27	77	86,736	
W6IBD	27	68	67,355	
W6FSJ	27	53	44,040	
W6BYH	24	51	42,194	
W6ALQ	22	49	33,341	
W6BJU	22	47	31,647	
W6EPZ	23	45	29,782	
W6SRF	18	46	19,980	
W6BUD	22	44	19,580	
W6ATO	20	43	12,879	
W6UQQ	20	38	11,183	
W6ALQ	20	33	9,752	
W6BJU	18	31	8,477	
W6QD	21	31	8,424	
W6NZW	16	31	8,131	
W6VE	16	28	7,680	
W6BYH	21	27	7,785	
W6PWR	17	26	7,644	
W6AMUR	16	30	6,540	
W6HJ	18	22	6,027	
W6QDE	15	23	5,700	
W6GWQ	15	20	5,350	
W6AE	17	23	4,280	
W6JST	14	17	2,677	
W6EJA	10	13	1,587	
W6LYW	6			
	10	14	1,400	
W6OKK	12	15	1,350	
W6HHI	6	9	486	
W6BYH	13	19	3,776	
W6NGA	14	18	3,232	
W6VE	14	18	3,136	
W6EPZ	14	17	1,674	
W6BJU	11	12	1,367	
W6ATO	10	13	1,012	
W6SRF	10	13	1,012	
W6NZW	8	9	864	
W6BYH	8	10	594	
W6NLO	7	9	496	
W6QDE	4	4	80	
W6EAY	5	5	80	
W6PBI	3	2	50	
W6GWQ	4	4	48	
W6LMZ	2	2	24	
W6GWQ	5	5	180	
W6SRF	5	5	130	
W6BYH	3	3	72	
W6BJU	1	1	6	
W7PQX	60	104	83,968	
W7PQE	51	69	51,840	
W7AJS	31	48	23,858	
W7AHX	36	46	20,172	
W7CNM	33	49	19,024	
W7HAD	40	45	17,680	21 Mc.
W7FIM	28	35	16,569	
W7OPO	27	35	12,896	
W7PCZ	22	28	6,930	
W7ENA	27	54	1,458	
W7EJD	9	13	1,320	
W7QDJ	15	13	1,316	
W7HAD	8	7	270	28 Mc.
W7PQX	6	5	242	
W7PQE	4	4	96	All Bands
W7OPO	3	2	30	
W7PQE	15	18	4,620	
W7PQX	16	30	4,002	
W7OPO	12	15	2,889	
W7CNM	12	14	1,924	
W7FIM	10	12	1,870	3.5 Mc.
W7AHX	9	12	1,785	
W7PCE	9	13	1,303	7 Mc.
W7HAD	7	8	510	
W7AJS	5	5	220	
W7QDJ	15	13	1,316	
W7QJV	4	4	72	
W7ENA	3	3	42	
W7EJD	1	1	6	14 Mc.
W7PQE	23	61	31,584	
W7PQX	25	54	28,045	
W7AJS	26	43	19,320	
W7PQE	19	34	11,607	
W7FIM	18	23	7,298	
W7BUW	18	23	7,052	
W7AHX	18	27	6,120	21 Mc.
W7CNM	16	29	5,895	
W7MOU	18	25	4,088	
W7HAD	15	19	3,366	28 Mc.
W7OPO	13	18	2,850	
W8JIN	23	36	11,800	
W8RFQX	16	25	3,918	
W8PM	10	13	644	
W8JGU/8	8	6	144	
W8DAE	4	3	54	
W8FJR	2	2	24	
W8JIN	28	68	40,176	
W8FQX	27	70	30,167	
W8FJR	19	45	15,744	
W8PM	11	14	625	
W8JGU/8	9	12	546	
W8DAE	9	11	440	
W8HA	5	7	204	
W8JIN	17	29	6,256	
W8PM	13	18	1,488	
W8KC	11	14	875	
W8JIN	9	8	459	
W8DAE	8	13	104	



DL1FI was tops in Germany with an all band score of 144,316. The rig runs about 100 watts input, and the antenna is a simple long wire affair, and as Felix says, "There is no need to rotate it." DL1FI has been on the air since 1927.

W7PCZ	13	16	2,233	All Bands
W7EJD	8	12	1,080	
W7ENA	5	4	243	
W7QDJ	5	4	180	
W7HAD	10	11	1,197	
W7PQX	11	13	936	
W7PQE	9	9	882	
W7AHX	9	7	400	
W7CNM	5	0	297	
W7ENA	6	0	240	
W7QDJ	5	4	135	
W7PQE	4	4	96	
W7PQX	2	2	36	
W8JIN	86	154	215,259	
W8FQX	43	95	56,242	
W8FJR	21	47	16,796	
W8PM	34	45	7,979	
W8DAE	19	21	1,640	
W8JGU/8				
	14	18	1,216	14 Mc.
W8JIN	9	13	1,210	
W8DAE	2	3	20	
W9PKW	45	80	72,625	
W9NDA	57	99	69,576	
W9RQM	66	96	65,772	
W9HUZ	60	95	57,040	
W9NII	47	65	33,080	
W9ABA	19	24	3,139	
W9FDX	14	22	2,160	
W9NDA	8	9	381	3.5 Mc.
W9RQM	7	7	350	
W9HUZ	7	8	195	
W9NII	5	5	110	
W9PKW	6	5	88	
W9NDA	20	33	8,162	7 Mc.
W9PKW	15	21	4,932	
W9RQM	15	21	3,168	
W9ABA	12	17	1,421	
W9NII	11	16	1,161	
W9HUZ	13	16	1,073	
W9FDX	1	1	6	
W9PKW	20	50	29,680	14 Mc.
W9HUZ	24	51	18,975	
W9NDA	23	50	18,788	

Single Operator Stations

	W9FID	22—	46—	17,884
	W9RQM	21—	37—	9,048
	W9NII	16—	26—	5,124
	W9FDX	13—	21—	1,934
	W9MEN	6—	9—	345
	W9FKC	7—	7—	168
21 Mc.	W9RQM	16—	25—	4,551
	W9NII	12—	19—	3,007
	W9HUZ	13—	17—	1,560
	W9NDA	6—	7—	169
28 Mc.	W9RQM	7—	6—	338
	W9ABA	7—	7—	336
	W9NII	3—	3—	72
	W9HUZ	3—	3—	78
All Bands	WØDAE	58—	87—	65,685
	WØNWX	44—	59—	23,381
	WØOKH	41—	53—	16,826
	WØYSC	23—	32—	4,510
	WØNXF	16—	19—	1,575
3.5 Mc.	WØNWX	6—	6—	288
	WØDAE	7—	7—	266
	WØOKH	6—	7—	195
7 Mc.	WØDAE	14—	24—	4,180
	WØNWX	14—	17—	2,232
	WØOKH	12—	15—	1,215
	WØYSC	9—	13—	770
	WØNXF	6 —	8—	238
14 Mc.	WØDAE	24—	45—	19,527
	WØERI	18—	35—	9,593
	WØCXN	17—	27—	3,564
	WØOKH	16—	22—	3,268
	WØNWX	14—	23—	2,849
	WØYSC	14—	19—	1,551
	WØNXF	10—	11—	588
21 Mc.	WØDCB	13—	15—	1,204
	WØNWX	9—	12—	1,071
	WØJZX	10—	9—	532
	WØOKH	7—	9—	528
	WØDAE	9—	7—	464
28 Mc.	WØDAE	4—	4—	96
	WØNWX	1—	1—	6

Alaska

7 Mc.	KL7RZ	4—	5—	189
14 Mc.	KL7ANJ	9—	9—	2,250
	KL7AQB	2—	3—	70

Bermuda

All Bands	VP9BF	68—	129—	183,080

Caicos Island

All Bands	VP5BF	19—	23—	10,542

Canada

All Bands	VE1EK	20—	33—	6,148
	VE1ZZ	20—	27—	5,875
3.5 Mc.	VE1ZZ	8—	12—	1,380
	VE1EK	2—	2—	4
7 Mc.	VE1EK	5—	7—	324
	VE1ZZ	2—	3—	45
14 Mc.	VE1EK	13—	24—	3,256
	VE1WW	10—	12—	1,034
	VE1DB	8—	11—	912
	VE1CU	6—	10—	480
	VE1KB	7—	4—	368
All Bands	VE2WA	29—	46—	11,400
7 Mc.	VE2WA	8—	12—	520
14 Mc.	VE2CK	12—	27—	3,159
	VE2WA	13—	21—	2,244
21 Mc.	VE2WA	8—	13—	1,260
All Bands	VE3CCK	45—	80—	50,625
21 Mc.	VE3CCK	7—	10—	799
	VE3ADM	2—	3—	80
All Bands	VE5EH	18—	16—	5,746
All Bands	VE6MN	7—	8—	645
All Bands	VE7VO	37—	58—	42,874
	VE7VC	31—	47—	20,904
	VE7AIH	13—	15—	3,724
	VE7AHG	11—	10—	525
3.5 Mc.	VE7VO	5—	5—	240
	VE7VC	2—	2—	20
7 Mc.	VE7VO	12—	13—	3,300
	VE7VC	7—	7—	812
	VE7AHG	5—	5—	150
14 Mc.	VE7VO	20—	40—	17,160
	VE7VC	21—	37—	11,890
	VE7KL	17—	24—	6,2
	VE7AIH	3—	5—	1
	VE7AHG	6—	5—	1
21 Mc.	VE7AIH	10—	10—	2,3

Canal Zone

All Bands	KZ5BS	20—	24—	5,3
7 Mc.	KZ5BS	5—	5—	2
	KZ5WZ	3—	4—	2
14 Mc.	KZ5BS	8—	10—	8
21 Mc.	KZ5BS	7—	9—	8
	KZ5WZ	3—	4—	2

Cayman Islands

All Bands	VP5BH	11—	13—	2,8

Cuba

7 Mc.	CO2AQ	8—	9—	

Green'and

14 Mc.	OX3UD	6—	5—	

Guantanamo Bay

14 Mc.	KG4AF	26—	73—	84,8

Guatemala

14 Mc.	TG9RB	10—	12—	3,5

Puerto Rico

All Bands	KP4JE	51—	94—	284,0
	KP4KD	60—	122—	119,2
3.5 Mc.	KP4JE	7—	10—	3,7
	KP4KD	9—	15—	9
7 Mc.	KP4JE	17—	30—	21,5
	KP4KD	15—	28—	6,3
14 Mc.	KP4JE	13—	34—	48,3
	KP4KD	19—	47—	15,8
	KP4AO	19—	50—	12,4
21 Mc.	KP4KD	15—	31—	10,3
	KP4JE	13—	19—	7,9
28 Mc.	KP4KD	2—	1—	
	KP4JE	1—	1—	

W6AM was the third highest multiple operators' station in the world and ran up 223,210 points. Don received plenty of help from W6HX, W6BXL and W6QMC. Since you've seen the station photo of W6AM several times, this will give you a good idea of what the shack looks like from the outside. The operating room is to the right and is 30 x 40 feet. The workshop is in the middle, while the bedrooms are on the left. Three of the poles in the picture are 100-footers, while the one on the right is 70 feet. Eleven Rhombics are used, and with the use of the reversing relays 21 directions are available. This is done by turning only a small rotary switch. Receivers are RME-50, RME-49, while the transmitters use 4-250As and 450THs.

South America

Argentina

All Bands	LU3EL	36—	51—	28,7

Brazil

All Bands	PY6DU	35—	44—	44,6
7 Mc.	PY6DU	4—	2—	
14 Mc.	PY6DU	13—	18—	5,4
	PY7LN	7—	10—	1,2
	PY1AZO	8—	9—	
21 Mc.	PY6DU	11—	18—	8,4
28 Mc.	PY6DU	7—	6—	

Chile

All Bands	CE3AG	75—	118—	335,4
	CE4AD	37—	37—	42,2
3.5 Mc.	CE3AG	7—	7—	
	CE4AD	4—	3—	
7 Mc.	CE3AG	14—	21—	9,4
	CE4AD	5—	4—	
14 Mc.	CE3AG	28—	55—	74,4
	CE4AD	17—	20—	13,2
	CE3CK	16—	20—	9,4
21 Mc.	CE3AG	18—	27—	14,4
	CE4AD	7—	8—	
28 Mc.	CE3AG	8—	8—	2,4
	CE4AD	4—	2—	

Netherland West Indies

All Bands	PJ2AD	27—	57—	112,4

South Shetland Islands

All Bands	LU4ZI	25—	31—	33,4

Uruguay

14 Mc.	CX6AD	7—	7—	1,4

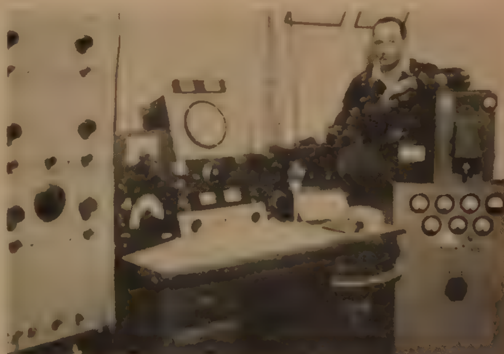
Venezuela

All Bands	YV5AB	38—	69—	168,4
	YV5BZ	37—	51—	64,4
7 Mc.	YV5AB	6—	7—	4,4
	YV5BZ	9—	10—	

14 Mc.	YV5AB	19—	49—	74,184
	YV5BZ	20—	35—	32,450
21 Mc.	YV5AB	10—	13—	3,151
28 Mc.	YV5BZ	8—	6—	1,442

Europe

Austria				
All Bands	OE5CA	39—	100—	64 635
Azores				
14 Mc.	CT2BO	5—	15—	2,700
Belgium				
All Bands	ON4WZ	27—	75—	20,302
	ON4MF	25—	73—	18 424
3.5 Mc.	ON4MF	4—	16—	400
	ON4WZ	3—	14—	336
7 Mc.	ON4WZ	7—	28—	2,450
	ON4MF	5—	15—	740
14 Mc.	ON4RT	17—	40—	7,467
	ON4MF	12—	38—	6,050
	ON4WZ	10—	25—	3,080
21 Mc.	ON4WZ	8—	8—	352
	ON4MF	4—	4—	80
Corsica				
All Bands	F9QV/FC	16—	65—	22 655
Czechoslovakia				
All Bands	OK1HI	51—	148—	146 066
	OK1MB	46—	121—	77,321
	OK1ZW	4—	17—	693
3.5 Mc.	OK1HI	6—	29—	3,220
	OK1MB	7—	25—	1,824
	OK1ZW	2—	6—	64
7 Mc.	OK1HI	17—	53—	12,627
	OK1MB	14—	34—	3,696
	OK1ZW	2—	11—	325
14 Mc.	OK1HI	24—	62—	38,614
	OK1MB	23—	50—	26,568
28 Mc.	OK1HI	4—	5—	90
	OK1MB	2—	3—	25
Denmark				
All Bands	OZ7BG	46—	118—	71,896
	OZ3PO	14—	30—	3,916
	OZ5K	8—	21—	1,682
3.5 Mc.	OZ7BG	4—	20—	1,392
	OZ4MB	2—	6—	136
	OZ2NU	1—	4—	30
7 Mc.	OZ7BG	8—	33—	7,838
	OZ3PO	3—	14—	680
	OZ7ML	4—	9—	247
	OZ5K	2—	[illegible]	[illegible]
14 Mc.	OZ7BG	23—	52—	16,500
	OZ3PO	9—	14—	1,081
	OZ5K	6—	15—	987
	OZ8A	11—	10—	735
21 Mc.	OZ7BG	11—	13—	1,032
	OZ3PO	2—	2—	8
England				
All Bands	G2VD	45—	115—	69,280
	G3FXB	45—	110—	67,425
	G2AJB	23—	65—	18,632
	G8QZ	19—	48—	7,370
3.5 Mc.	G5MP	8—	33—	6,725
	G2VD	7—	26—	3,696
	G3FXB	5—	28—	2,508
	G2AJB	3—	11—	252
	G8QZ	2—	2—	16
7 Mc.	G2VD	10—	33—	5,246
	G3FXB	11—	31—	3,990
	G4XC	7—	31—	3,838
	G3GEN	5—	26—	2,387
	G2AJB	7—	25—	2,720
	G8QZ	4—	12—	448
	G3AWR	4—	11—	890
14 Mc.	G2LB	27—	64—	71,526
	G3FXB	18—	38—	10,192
	G2VD	19—	39—	8,120
	G3DOG	16—	36—	7,644
	G8QZ	13—	24—	2,106
	G2AJB	9—	22—	2,015
	G3EEM	5—	8—	221
	G8CS	1—	1—	12
21 Mc.	G3FXB	11—	13—	1,988
	G2VD	9—	17—	1,334
	G2AJB	4—	7—	211
28 Mc.	G2BW	3—	5—	120
France				
All Bands	F8OP	22—	77—	39,996
	F9RM	31—	83—	36,782
	F9ND	23—	60—	19,671
	[illegible]	14—	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	4—	11—	360
3.5 Mc.	F9RM	4—	18—	1,254
	F9ND	3—	7—	108
	F9RS	1—	2—	6
7 Mc.	F8OP	9—	36—	5,625
	F9ND	4—	20—	1,526
	F9RM	5—	20—	1,525
	[illegible]	8—	13—	1,083
	[illegible]	4—	14—	522
	[illegible]	2—	11—	260
	[illegible]	2—	3—	25
14 Mc.	F8OP	13—	41—	15,066



ZS6OW operated all bands and wound up with 283,712 points. Eric uses a complete seperate transmitter for each band, and a line-up like this: A pair of T40's for 80, 35T's on 40, 814's on 20, 814's on 15, and HK54's on 10. The receiver is a HRO. The antenna department consists of a 3-element beam for 20, and 4 elements for 10 meters. On 40 and 80 he uses semi-vertical dipoles.

	F9ND	14—	31—	6,600
	F9RM	13—	31—	6,600
	[illegible]	8—	19—	3,078
	[illegible]	11—	17—	2,520
	[illegible]	11—	22—	1,881
	[illegible]	6—	13—	1,140
	[illegible]	7—	17—	1,128
	[illegible]	3—	5—	206
	[illegible]	2—	8—	171
21 Mc.	F8BS	12—	23—	4,375
	F9RM	9—	14—	1,150
	F3YE	8—	9—	816
	F9ND	2—	2—	24
Finland				
All Bands	OH3NY	15—	58—	14,746
	OH5OV	10—	38—	6,528
	OH3RL	14—	39—	4,717
	OH2YK	10—	33—	4,601
3.5 Mc.	OH3NY	3—	14—	1,190
	OH2YV	2—	10—	276
	OH3RL	2—	4—	42
7 Mc.	OH1PI	7—	27—	3,400
	OH3NY	3—	7—	700
	OH3RL	5—	16—	504
	OH5OV	2—	7—	81
	OH2YK	3—	3—	54
14 Mc.	OH1PW	14—	39—	12,190
	OH2VF	11—	35—	8,096
	OH5NR	9—	32—	7,052
	OH2ZC	10—	40—	8,100
	OH5OV	8—	31—	4,953
	OH2YK	7—	30—	3,626
	OH3NY	9—	27—	3,492
	OH2ZL	11—	27—	2,394
	OH2ND	8—	25—	2,442
	OH3NJ	5—	25—	1,450
	OH3RL	7—	10—	832
	OH5OZ	4—	15—	494
	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	10—	[illegible]
	[illegible]	[illegible]	9—	132
Germany				
All Bands	DL1FI	63—	155—	144,316
	DL1AU	59—	137—	99,960
	DL2RO	45—	108—	69,003
	DL1BR	41—	103—	63,488
	DL1EI	42—	97—	58,658
	DL1JW	40—	100—	49,140
	DL9KR	32—	71—	31,518
	DL1FE	34—	77—	31,413
	DL4JN	24—	80—	27,144
	DL1BV	35—	78—	26,874
	DL1VA	25—	83—	23,112
	DL7EN	24—	62—	18,576
	DL6MU	23—	56—	18,012
	DL7CW	26—	57—	11,537
	DL1HA	21—	40—	10,492
	DL1KB	26—	49—	10,350
	DL3WT	19—	53—	9,504
	DL1TH	16—	50—	7,392
	DL9PT	15—	34	5,831
	DL3WA	10—	28—	3,800
	DL6DF	10—	29—	3,042
	DL7AU	8—	29—	2,671
	DL7EK	5—	15—	640
	DL7AY	10—	12—	594
3.5 Mc.	DL1FF	12—	43—	10,175
	DL1FI	7—	30—	4,366
	DL2RO	6—	24—	2,070
	DL1JW	5—	25—	1,920
	DL1BR	6—	25—	1,736
	DL4JN	5—	23—	1,540
	DL1YA	3—	19—	902
	DL1FE	4—	17	819
	DL7AU	4—	19—	627
	DL1KB	5—	18—	575
	DL1TH	2—	15—	425
	DL1EI	3—	15—	378
	DL1AU	4—	14—	306
	DL1BV	3—	8—	276
	DL7CW	3—	10—	221
	DL7EN	2—	8—	210

Single Operator Stations

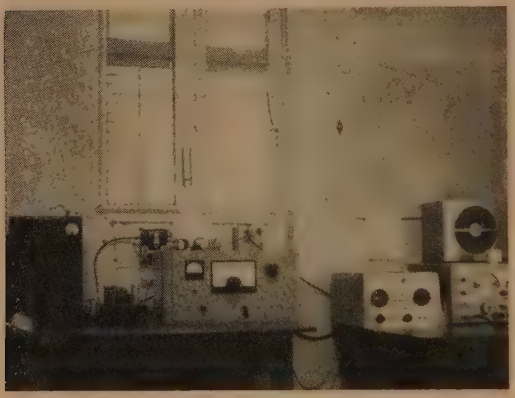
Europe

	DL3WA	3—	7—	180	
	DL3WT	2—	10—	180	
	DL6MU	2—	8—	130	
	DL9NM	2—	9—	99	
	DL7EK	1—	4—	20	
7 Mc.	**DL1AU**	**17—**	**47—**	**11,776**	
	DL1FI	**17—**	**47—**	**11,392**	
	DL1BR	**11—**	**34—**	**6,330**	
	DL1FE	8—	34—	5,292	
	DL4JN	8—	31—	4,541	
	DL9KR	8—	29—	3,219	
	DL1BV	10—	27—	3,071	
	DL2RO	10—	27—	2,849	
	DL7CW	9—	26—	2,450	
	DL1JW	7—	26—	**2,440**	
	DL1YA	6—	26—	2,400	
	DL1TH	7—	23—	1,890	
	DL7EN	7—	19—	1,534	
	DL1KB	10—	19—	1,363	
	DL9PJ	4—	13—	646	
	DL6MU	7—	8—	420	
	DL3WT	3—	12—	390	

21 Mc.	**DL1AU**	**15—**	**26—**	**4,305**	
	DL1EI	**13—**	**24—**	**3,922**	
	DL2RO	**14—**	**24—**	**3,230**	
	DL1FI	15—	24—	2,855	
	DL1JW	13—	16—	2,407	
	DL1BR	10—	17—	1,890	
	DL1KB	5—	5—	420	
	DL9KR	6—	8—	308	
	DL7CW	5—	6—	209	
	DL7EK	1—	1—	6	
28 Mc.	**DL1FE**	**13—**	**18—**	**1,674**	
	DL1AU	**5—**	**8—**	**195**	
	DL1YA	**4—**	**4—**	**72**	
	DL1BV	3—	4—	63	
	DL1FI	2—	2—	24	

Iceland

All Bands	**TF5SV**	**24—**	**43—**	**42,679**	
	TF3SF	**34—**	**66—**	**41,800**	
	TF3AB	**18—**	**40—**	**20,126**	
	TF3MB	13—	25—	8,854	
	TF3JG	11—	25—	3,528	



KP4JE ran up 284,055 for one of the world high spots. Maurice runs 400 watts into a single 813, while the receiver is a NC-183. Only one antenna is used and this happens to be 137-foot center fed dipole.

	DL7EK	2—	8—	230	
	DL1HA	4—	6—	190	
	DL1EI	2—	3—	126	
	DL7AW	2—	7—	99	
	DL6DF	4—	6—	90	
	DL9FI	2—	5—	28	
	DL7AY	2—	2—	20	
14 Mc.	**DL1FI**	**22—**	**52—**	**21,375**	
	DL1EI	**23—**	**50—**	**20,513**	
	DL6WD	**16—**	**42—**	**13,456**	
	DL1AU	18—	42—	11,340	
	DL2RO	15—	33—	10,560	
	DL6MU	14—	40—	10,098	
	DL1BV	19—	39—	7,540	
	DL1HA	17—	34—	7,334	
	DL7EN	15—	35—	6,800	
	DL1JW	15—	33—	6,240	
	DL1BR	13—	26—	6,201	
	DL9KR	18—	34—	5,044	
	DL3WT	14—	31—	4,095	
	DL1YA	12—	34—	4,094	
	DL1FE	12—	24—	3,780	
	DL1HH	13—	31—	3,300	
	DL4JN	11—	26—	3,219	
	DL9PJ	11—	21—	2,592	
	DL3WA	7—	21—	2,296	
	DL6DF	6—	23—	2,072	
	DL3DD	7—	24—	1,767	
	DL7CW	9—	15—	792	
	DL1TH	7—	12—	456	
	DL7AY	8—	10—	450	
	DL1KB	6—	7—	312	
	DL7AU	2—	3—	15	
	DL7EK	1—	2—	6	

7 Mc.	**TF5SV**	**9—**	**14—**	**943**	
	TF3SF	**7—**	**11—**	**393**	
	TF3AB	**7—**	**11—**	**378**	
	TF3MB	3—	4—	49	
	TF3JG	3—	5—	40	
14 Mc.	**TF5SV**	**15—**	**29—**	**26,224**	
	TF3SF	**16—**	**39—**	**12,753**	
	TF3AB	**9—**	**27—**	**11,736**	
	TF3MB	8—	19—	6,102	
	TF3JG	8—	20—	2,604	
21 Mc.	**TF3SF**	**10—**	**15—**	**1,723**	

Ireland

All Bands	**EI9J**	**22—**	**47—**	**24,702**	

Italy

All Bands	**I1KN**	**33—**	**94—**	**46,101**	
	I1CJW	**27—**	**68—**	**33,525**	
	I1IT	**28—**	**74—**	**19,055**	
	I1BUQ	14—	49—	12,033	
3.5 Mc.	**I1KN**	**4—**	**13—**	**578**	
7 Mc.	**I1KN**	**9—**	**31—**	**3,920**	
	I1IT	**9—**	**27—**	**2,628**	
	I1BUQ	**5—**	**20—**	**1,700**	
	I1CJW	4—	11—	300	
	I1BLN	2—	8—	170	
14 Mc.	**I1CJW**	**23—**	**57—**	**30,000**	
	I1OJ	**19—**	**57—**	**28,044**	
	I1KN	**18—**	**48—**	**14,850**	
	I1BUQ	9—	29—	4,674	
	I1IT	10—	30—	2,952	
	I1ABB	6—	16—	946	
21 Mc.	**I1IT**	**9—**	**17—**	**1,040**	
28 Mc.	**I1KN**	**2—**	**2—**	**24**	

Malta

All Bands	**ZB1KA**	**15—**	**36—**	**9,741**	

Netherlands

All Bands	**PAØKW**	**48—**	**116—**	**73,800**	
	PAØVB	**43—**	**92—**	**50,220**	
	PAØSPR	**20—**	**63—**	**28,220**	
	PAØWAC	13—	39—	7,435	
	PAØTAU	13—	35—	4,032	
	PAØVDV	11—	26—	2,109	
	PAØGER	7—	21—	1,708	
3.5 Mc.	**PAØIP**	**6—**	**26—**	**2,784**	
	PAØKW	**7—**	**25—**	**2,208**	
	PAØVB	**8—**	**19—**	**1,235**	
	PAØVDV	4—	14—	558	
	PAØGER	2—	7—	117	
	PAØWAC	1—	3—	18	
7 Mc.	**PAØVB**	**9—**	**29—**	**3,498**	
	PAØKW	**7—**	**29—**	**3,312**	
	PAØSPR	**5—**	**21—**	**1,092**	
	PAØGER	5—	14—	912	
	PAØCD	6—	32—	576	
	PAØVDV	4—	4—	80	
	PAØTAU	2—	7—	63	
14 Mc.	**PAØSPR**			**16,986**	
	PAØDN	**18—**	**44—**	**14,884**	
	PAØKW	**19—**	**43—**	**14,694**	
	PAØVB	17—	30—	8,554	
	PAØWAC	12—	36—	6,671	
	PAØTAU	11—	28—	3,003	
	PAØLY	12—	13—	1,000	
	PAØVDV	3—	8—	176	
21 Mc.	**PAØKW**	**14—**	**18—**	**1,664**	
	PAØVB	**9—**	**14—**	**756**	

North Ireland

21 Mc.	**GI5HZ**	**11—**	**14—**	**1,354**	

Norway

All Bands	**LA6FA**	**13—**	**30—**	**3,568**	
	LJ3A	**6—**	**15—**	**903**	
	LA9T	**7—**	**8—**	**252**	
3.5 Mc.	**LA6FA**	**2—**	**6—**	**54**	
7 Mc.	**LJ3A**	**2—**	**7—**	**198**	
	LA6FA	**4—**	**6—**	**112**	
14 Mc.	**LA6FA**	**7—**	**22—**	**1,888**	
	LA2PD	**8—**	**18—**	**1,320**	
	LJ3A	**4—**	**8—**	**252**	
	LA9T	4—	4—	80	
21 Mc.	**LA9T**	**3—**	**4—**	**48**	

Poland

All Bands	**SP3PF**	**39—**	**126—**	**97,188**	
	SP6XA	**21—**	**49—**	**11,200**	
7 Mc.	**SP3PF**	**9—**	**35—**	**5,850**	
	SP6XA	**7—**	**11—**	**660**	
14 Mc.	**SP3PF**	**22—**	**57—**	**22,910**	
	SP6XA	**14—**	**38—**	**6,390**	
28 Mc.	**SP3PF**	**2—**	**2—**	**2**	

Portugal

All Bands	**CT1ST**	**16—**	**19—**	**3,744**	

Saarland

All Bands	**9S4AX**	**31—**	**62—**	**26,226**	

Sardinia

All Bands	**IS1AHK**	**23—**	**58—**	**21,780**	

Scotland

All Bands	**GM3CSM**	**29—**	**58—**	**18,870**	

Spain

All Bands	**EA1AB**	**28—**	**105—**	**105,868**	
	EA3CK	**34—**	**60—**	**18,700**	
3.5 Mc.	**EA1AB**	**5—**	**17—**	**1,785**	
7 Mc.	**EA1AB**	**6—**	**33—**	**6,660**	
	EA3CK	**6—**	**12—**	**567**	
	EA5AQ	**1—**	**8—**	**184**	
14 Mc.	**EA1AB**	**12—**	**39—**	**22,880**	
	EA3CK	**14—**	**29—**	**4,540**	
	EA3IX	**5—**	**18—**	**1,035**	
21 Mc.	**EA1AB**	**5—**	**16—**	**1,995**	
	EA3CK	**13—**	**18—**	**1,890**	

Sweden

All Bands	**SM5DW**	**34—**	**115—**	**65,850**	
	SM3AKM	**28—**	**92—**	**63,112**	
	SM5ANY	**28—**	**86—**	**42,060**	
	SM5AOI	28—	74—	28,760	
	SM3EP	22—	69—	25,020	
	SM5BQJ	25—	84—	18,170	
	SM6DA	18—	41—	10,200	
	SM5ARL	11—	45—	7,380	

Single Operator Stations

	SM7AKG	18—	[illegible]	[illegible]
	SM5AUP	18—	[illegible]	[illegible]
	SM7AVA	18—	[illegible]	[illegible]
	SM3AWP	26—	[illegible]	3 190
	SM6AMR	9—	[illegible]	2,178
	SM7BDK	3—	[illegible]	49[illegible]
Mc.	SM5DW	5—	28—	2 970
	SM7BFL	4—	23—	2 349
	SM3AKM	4—	19—	1,173
	SM5ANY	3—	[illegible]	960
	SM5ARL	2—	14—	784
	SM7AKG	4	[illegible]	476
	SM5ARR	3	[illegible]	351
	SM5BQJ	3	[illegible]	198
	SM7BDK	1	6	84
	SM3AWP	2	4	[illegible]
	SM6AMR	2	[illegible]	[illegible]
	SM6[illegible]	1	2—	6
Mc	SM5AHW	10—	35—	7 020
	SM5DW	10—	40—	6 250
	SM5ANY	9—	33—	4 914
	SM5WM	[illegible]	[illegible]	4 [illegible]
	SM7AAZ	9	[illegible]	3 744
	SM3EP	8	[illegible]	3 [illegible]
	SM5ACI	9—	[illegible]	2 [illegible]
	SL7BX	5	[illegible]	2 4[illegible]
	SM6AJN	4	[illegible]	2 [illegible]
	SM5BQJ	[illegible]	[illegible]	2 24[illegible]
	SM3AKM	[illegible]	[illegible]	2 1[illegible]
	SM3AWP	[illegible]	[illegible]	1 [illegible]
	SM7AVA	[illegible]	[illegible]	[illegible]
	SM5AUP	[illegible]	[illegible]	[illegible]
	SM5AFN	[illegible]	[illegible]	774
	SM5WK	3	[illegible]	4[illegible]
	SM5ARL	3	[illegible]	[illegible]
	SM7BDK	2—	[illegible]	[illegible]
	SM2AIC	1	[illegible]	[illegible]
	SM7PK	2	[illegible]	[illegible]
	SM4[illegible]	2—	2—	[illegible]
	SM6AMR	1	[illegible]	4
Mc.	SM3AKM	19—	47—	26 730
	SM5DW	19—	47—	14 982
	SM5AOI	19—	45—	13,056
	SM5ANY	16	[illegible]	10,[illegible]
	SM5ACP	16	[illegible]	10 17[illegible]
	SM5DA	14—	[illegible]	9 57[illegible]
	SM3EP	14	[illegible]	9 911
	SM5IZ	17	4[illegible]	[illegible]
	SM7VX	15—	41—	[illegible]
	SL3AU	10	25	7 [illegible]
	SM5BQJ	14—	[illegible]	6 [illegible]
	SM5AUN	13—	[illegible]	[illegible]
	SM6APB	13—	[illegible]	[illegible]
	SM6AOU	14—	[illegible]	4 [illegible]
	SM5AUP	11—	[illegible]	4 [illegible]
	SM7AVA	10—	22	2 442
	SM7AKG	14—	24—	2 [illegible]
	SM5ARL	6—	22	1 [illegible]
	SM6AMR	6—	20	1 [illegible]
	SM5US	6—	16—	1 188
	SM7BVO	7—	12	1 007
	SM3AWP	7—	9	120
	SM5PW	3—	3—	42
	SM6BCP	2—	3—	20

Switzerland

All Bands	HB9KO	25	74—	29,007
	HB9MU	29	68—	23,560
	HB9X	27—	58—	14,620
	HB9CZ	21	48	13,[illegible]
	HB9CI	11	34—	4,725
	HB9LO	21—	25—	3,680
	HB9DB			266
3.5 Mc.	HB9KO	4—	18—	1,386
	HB9CZ	4—	11—	525
	HB9MU	4—	9—	208
	HB9X	3—	10—	143
	HB9DB	2—	8—	130
7 Mc.	HB9KO	12—	30—	3,948
	HB9MQ	9—	18—	2,136
	HB9X	7—	17—	960
	HB9CZ	5—	17—	792
	HB9CI	3—	9—	120
	HB9LO	4—	6—	108
	HB9MU	1—	1—	6
14 Mc.	HB9MU	21—	53—	16,280
	HB9KO	9—	26—	4,760
	HB9BT	10—	22—	3,808
	HB9CZ	10—	18—	3,416
	HB9CI	8—	25—	3,135
	HB9X	12—	21—	3,036
	HB9LO	2—	2—	16
21 Mc.	HB9LO	10—	12—	902
	HB9X	8—	10—	435
	HB9MU	3—	3—	54
	HB9DB	2—	2—	24
	HB9CZ	2—	2—	16
28 Mc.	HB9LO	8—	6—	253

Trieste

All Bands	I1NU/ TRIESTE	23—	77—	33,700
3.5 Mc.	I1NU/ TRIESTE	4—	18—	1,562
7 Mc.	I1NU/ TRIESTE	8—	28—	4,284
14 Mc.	I1NU/ TRIESTE	11—	31—	6,174
	MF2AG	13—	22—	3,710

Wales

All Bands	GW3JI	24—	77—	32 623
3.5 Mc.	GW3JI	3—	16—	969
7 Mc.	GW3JI	10—	36—	7,368
14 Mc.	GW5SL	16—	44—	14,940
	GW3JI	11—	25—	4,104
	GW3IQQ	6—	16—	1,364

Yugoslavia

7 Mc.	YU1AG	10—	31—	7,503

Africa

Algeria

All Bands	FA9RZ	40—	100—	125,020
	FA9UO	34—	66—	66,800
	FA8IH	41—	80—	39,446
	FA3HH	7—	34—	17,712
3.5 Mc.	FA9RZ	8—	17—	3,036
	FA9UO	4—	8—	900
	FA8IH	4—	14—	882
7 Mc.	FA9RZ	10—	28—	10,716
	FA9UO	7—	19—	6,188
	FA3HH	3—	17—	3,840
	FA8IH	8—	19—	1,944
14 Mc.	FA9RZ	10—	29—	11,427
	FA9UO	10—	22—	8,576
	FA8IH	17—	31—	7,488
	FA8VZ	8—	21—	7,332
	FA3HH	4—	17—	5,040
21 Mc.	FA9RZ	12—	23—	6,195
	FA9UO	11—	15—	2,210
	FA8IH	12—	16—	1,372
28 Mc.	FA9RZ	2—	3—	45
	FA9UO	2—	2—	8

French West Africa

All Bands	FF8AG	44—	94—	207,276
7 Mc.	FF8AG	10—	26—	18,152
14 Mc.	FF8AG	18—	37—	33,715
	FF8AN	15—	28—	12,441
	5A2TC	4—	18—	3,696
21 Mc.	FF8AG	13—	26—	13,182
28 Mc.	FF8AG	3—	5—	152

Libya

All Bands	5A2TC	15—	58—	49,421
7 Mc.	5A3TR	10—	34—	33,616
	FF8AJ	14—	19—	8,877
14 Mc.	5A3TU	30—	71—	104,130
	5A2TC	6—	28—	14,416
21 Mc.	5A2TC	5—	12—	1,445

KH6IJ, as usual, scored a flock of points at this time—283,094. He still uses 450TH's and 813's, and two separate complete transmitters. We're sure you are familiar with the rest of his station layout.

Madagascar

14 Mc.	FB8BB	24—	34—	11,404

Madeira Islands

All Bands	CT3AB	27—	41—	28,696
	CT3AV	28—	37—	26,350
3.5 Mc.	CT3AV	3—	8—	330
	CT3AB	2—	8—	233

Madeira Islands

7 Mc.	CT3AB	11—	17—	5,348
	CT3AV	4—	12—	768
14 Mc.	CT3AV	12—	28—	7,520
	CT3AA	12—	19—	4,340
	CT3AB	7—	11—	2,430
21 Mc.	CT3AV	7—	7—	560
	CT3AB	4—	5—	432
28 Mc.	CT3AB	3—	3—	54
	CT3AV	2—	2—	16

Morocco

All Bands	CN8EG	26—	76—	153,408
7 Mc.	CN8EG	7—	25—	5,440
14 Mc.	CN8EG	14—	42—	73,080
	CN8AG	7—	28—	9,590
28 Mc.	CN8EG	5—	9—	406

Mozambique

All Bands	CR7AF	31—	50—	17,658

(Continued on page 68)

Rules For The

World - Wide DX Contest

1. Contest Period:

PHONE SECTIONS: 0200 GMT October 24 to 0200 GMT October 26.
CW SECTIONS: 0200 GMT October 31 to 0200 GMT November 2.
(See time chart for local times and dates.)

2. Bands:

The contest activity will be in the 3.5, 7, 14, 21, and 27/28-Mc amateur bands.

3. Types of Competition:

Competition will be divided into four sections as follows:
(1) One-operator phone section
(2) Multiple-operator phone section
(3) One-operator CW section
(4) Multiple-operator CW section
Stations in both phone sections may contact each other, and stations in both CW sections may contact each other, but no contacts between phone and CW stations will be allowed.

4. Equipment:

There will be no limit to the number of transmitters and receivers allowed, and competitors may use the maximum transmitter power permitted under the terms of their licenses.

5. Serial Numbers:

CW stations will exchange serial numbers consisting of five numerals, the first three being the RST report, and the last two being their own Zone number. Stations in Zones 1 through 9 will prefix their Zone number with z (01, 02, 03, etc.) Phone stations will excha serial numbers consisting of four numer The first two being the readability and streng report, and the last two being their own Z number. Phone stations in Zones 1 through will prefix their Zone number with a zero (02, 03, etc.).

6. Contacts:

Contacts between amateur stations on ferent continents shall count 3 points; conta between amateur stations on the same co nent, but not in the same country, shall co 1 point; contacts between stations in the sa country, for the purpose of obtaining z and/or country multipliers, shall be permitt but no points will be allowed for these c tacts. More than one contact between stati on each band will not be permitted.

7. Multipliers:

Two types of multipliers will be used: a multiplier of 1 for each Zone contacted each band, (2) a multiplier of 1 for each co try worked on each band.

8. Awards:

1st, 2nd, and 3rd place Certificates will awarded for each of the four Sections as lows:
A. To the highest scoring stations on e SINGLE BAND in the following area
(a) Each call area of the U.S.A.
(b) Each licensing area of Canada Australia

WORLD-WIDE DX CONTEST SCHEDULE

TIME ZONE	STARTING TIME	ENDING TIME
Greenwich Mean Time (GMT) (London)	Saturday, Oct. 24, 0200 Saturday, Oct. 31, 0200	Monday, Oct. 26, 0200 Monday, Nov. 2, 0200
U.S.A. Eastern Standard Time	Friday, Oct. 23, 9:00 P.M. Friday, Oct. 30, 9:00 P.M.	Sunday, Oct. 25, 9:00 P.M. Sunday, Nov. 1, 9:00 P.M.
U.S.A. Pacific Standard Time	Friday, Oct. 23, 6:00 P.M. Friday, Oct. 30, 6:00 P.M.	Sunday, Oct. 25, 6:00 P.M. Sunday, Nov. 1, 6:00 P.M.

WORLD-WIDE DX CONTEST LOG

L 4X4RE COUNTRY Israel PHONE ☐ C. W. [X]

FOR 14 MC BAND (separate log for each band) CALL LETTERS OF OTHER OPERATORS NR OPERATORS one

DATE (GMT)	TIME (GMT)	STATION	SERIAL NUMBERS SENT	SERIAL NUMBERS RECEIVED	FILL IN ONLY WHEN QSO IS A MULTIPLIER WAZ ZONE NR	FILL IN ONLY WHEN QSO IS A MULTIPLIER NAME OF COUNTRY	POINTS (1 or 3)
ov 1	0700	CE3AG	57920	57912	12	Chile	3
"	0703	HZ1AB	58920	58921	21	Saudi Arabia	1
"	0706	W4KFC	59920	58905	5	USA	3
"	0708	4X4BX	59920	59920	20	Israel	
"	0710	CR5AC	56920	56935	35	Port. Guinea	3
		TOTAL NUMBER ZONES, COUNTRIES, POINTS:			5	5	10

(c) All other countries

B. To the stations having the highest combined total on ALL BANDS (or more than one band) in the following areas:

(a) Each call area of the U.S.A.

(b) Each licensing area of Canada and Australia

(c) All other countries

Certificates will also be awarded to each erator of each winning station in the multi operator sections.

9. Scoring:

The contest score for each single band is the n of the Zone and Country multipliers of ch band, multiplied by the contact points of t band. The total all band score is the sum the Zone and Country multipliers of all nds, multiplied by the total of contact points all bands.

A. Everyone who sends in a log for a single nd is eligible for a single band award only. B. Those who submit logs for two or more nds will be eligible for the All-Band award, well as the Single-Band award. For the pur- e of club scores, all classes of individual res may be included in the grand total.

10. Zones and Continents:

To check your own Zone number and con- ent for scoring purposes, refer to our country form as defined in CQ (April, 1955) and *CQ DX Handbook*, as well as on the WAZ ps, will be recognized, and for continental ndaries, the same as used for WAC will be ognized. Should any question arise as to the itive location of any station, the official defi- ions will be final. Copies of the country list and contest logs are available from the Buchanan address listed below, upon receipt of a stamped, self-addressed envelope, or in the case of overseas stations, unattached postage stamps.

All logs must be postmarked no later than December 15, 1953.

Send logs direct to:

International DX Club

P.O. Box 100

Buchanan, Mich., U.S.A.

Operating Suggestions:

Attention: Foreign Amateurs! It is recommended that you give the call letters of the station you are working at the end of a transmission, instead of just "BK," as this would prevent much QRM of stations piling on and calling you.

We suggest that overseas phone operators indicate which end of the band they are tuning, or which portions of the phone band (American or foreign) they intend to tune. On 28 or 21 Mc., it is extremely important that overseas phone stations specify the approximate frequency they intend to tune. CW stations, likewise, could greatly assist by indicating where they intend to tune. We think if the above principle is used by all, it will result in far less QRM, as well as fewer useless calls.

Foreign amateurs, remember scores are based on the greatest number of different countries and zones as well as stations worked. Do not concentrate on working only U.S. stations, this is a World-Wide competition!

Monitored by LOUISA B. SANDO, W5RZJ

959-C 24th St., Los Alamos, New Mexico

Tornado after tornado! When one struck Flint, Mich., we feared the Stuewes might be in the middle of it. They were—handling emergency traffic. Esther stayed at the home rig, using John's call, W8QBO, since it is better known than W8ATB, and John operated mobile working in cooperation with the Red Cross. After the tornado struck on Monday they stayed at their rigs for 19 straight hours relaying messages. By the following week-end, after little sleep and hardly a square meal, they figured they had between 2500 to 3000 messages and inquiries completed, having worked over 600 other stations to clear the traffic. They are but two of the many Hams who helped, but hundreds of families were helped by their efforts.

Conventions

The weekend of May 23rd was a busy one for YL's with the W9 district YL third annual convention at Mishawaka, Ind., the annual Oregon Amateur Radio Assn. convention held this year in Salem, and the New Mexico State picnic at Roswell. Eleven YL's turned up at Mishawaka, twenty at Salem, and thirteen at Roswell. Photos of the first two groups are included in this column. Sorry, gals, but we just couldn't get the third one in this time, much as we'd like to have a "picture issue"; look for it next month.

W9LRT, Julie, was chairman of the W9 convention. Most of the YL's arrived on the 22nd in time for open house that evening at the Mishawaka Hotel, which included games and prizes and a late supper. Saturday morning all the YL's were taken on a tour of Mishawaka, South Bend and the University of Notre Dame by Welcome Wagon hostesses. Lun was served at the Club Normandy after which address and a key to the city were given by t secretary of the Mishawaka Chamber of Commerc An interesting lecture and demonstration of sing sideband technique was given by W9OHM. Ma event of the convention was the banquet Saturd evening at the Club Normandy, with music by t Mobilaires, musicians who also are mobile rad operators. Highlight of the evening were door priz The first three were a Health Kit grid-dip meter w by W9LRT, Julie; a Wen soldering gun won W9KQC, Virginia, and a Gonset 100%-er won W9LOY, Cris. Though no activities had be planned for Sunday, Julie gave a spaghetti dinn for all who had stayed. The gals decided that ne year's convention will be held in Milwaukee wi W9AYK, Jackie, chairman.

Activities for the YL's and XYL's attending t Oregon convention were outstanding, according Bea, W7HHH. Many enjoyed the tour of the Ca tol and government buildings Saturday mornin This was followed by a luncheon at the Mari Hotel, featuring a hair style show, and at which the gals received a pair of hand-made ear rings. Su day morning a breakfast was held at the same pla with everyone receiving a lovely gift. All of t gifts were donated by the wives of the Salem Ha and many of them were hand-made. At noon Sunday most of the YL operators gathered in t Coral Room for a luncheon meeting arranged W7RIC, Nina May. The place cards were made W7HHH and were tiny 4½-inch celluloid dolls wi

Enjoying the banquet du ing the W9 YL conventi at Mishawaka, Ind., a left to right, seate W9FZO, KMG, KQ WN9YBC, Norma Dan SJR, SEZ, AYX, LRT, GM MLE, Terry (LOY's jr. op and LOY. Standing: W9S Evelyn and Larry Tibbi KRK, LRM, Carol a David (SEZ's jr. ops), a RQF.

Peg Wells, W1BCU, new president of YLRL.

hand-crocheted dresses, hats and panties. On a tiny staff was a banner on which was written each YL's call. After a short talk by Bea, May Lou Hill, ex-WH6ANP, recently from Hawaii, gave a talk on the activities of the KH6 YL's. During the dance held Saturday evening the ladies paraded in a grand march wearing junk-box hats. There were twenty entrants and the creations were something to behold. W7RAX, June, won first prize, and W7HHH, Bea, got the second. Bea topped off the convention by being interviewed over station KSAE in Salem along with ARRL President Dosland, Northwest Division Director Roberts, and others on a 15-minute program Sunday evening. The gals are already looking forward to next year's affair.

It was rather on the warm and windy side at Roswell, but this didn't lessen the enthusiasm of the thirteen YL's who got together at the New Mexico state picnic. Some of us had driven several hundred miles to get there so we made the best of the opportunity. Those attending: W5ZER, Isabel; W5RTS, Cleta; DRA, Teev; RFK, Deloris; TYX, Lizette; UXW, Opal; RQK, Lillie; ZA, Eunice; YAS, Blanche; ZEV, Irma; TDB, Emma; W6EHA/5, Gen, and W5RZJ. More details next month when we run the photo.

With the Clubs

A week before the YL gatherings mentioned above the YL clubs of New York City and Long Island got together for a joint meeting at the home of the NYC unit's president, W2TBU, Kit. The Long Island unit was represented by W2KDP, BXT, KN2CFF, JZX, SUR and JZX's mother. The NYC group included W2TBU, RAQ, EEO, IQP, QWL, MVV, PZA, OWL, IGA, VXC and several associate members and guests. Special guests were W3JSH/2, Dot, retiring VP of YLRL, and W1QON, Eleanor, formerly publicity chairman. Both of these gals talked to the group, and W2IQP, Lil, entertained with tricks of magic, one of her other hobbies.

At the June meeting of LARK in Chicago, new officers were elected for the coming year: W9SJR, Bernice Schmidt, president; W9MYC, Gladys Jones, vice president; W9IKS, Edna Newmann, secretary-treasurer. The girls are planning to hold a picnic, open to all Hams, on August 16th at Labaugh Woods in Chicago.

The member of LARK also have taken on another project—the editorship, as a club, of YLRL *Harmonics*. This seems like an FB plan for it is much too big a task for any one YL.

"YL Beam"

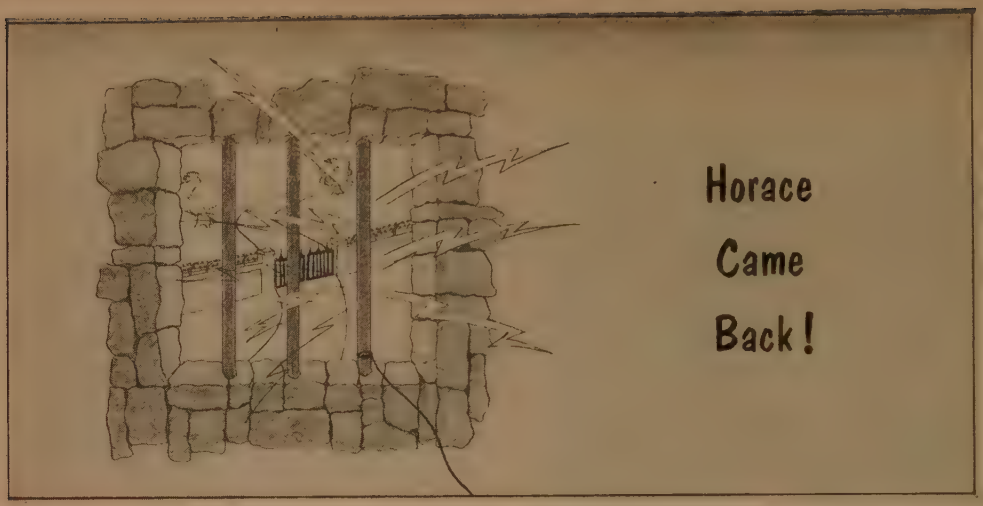
The South African Women's Radio Club publishes its own paper called the "YL Beam." We have enjoyed several issues of it, and especially in the April issue the account of ZS6GH's wedding. Diana has many friends in W-land who will be interested to know that she and Reg, ZS6J, were married on February 26th. Of course there was a record gathering of Hams for the affair. Lots of good luck, Diana and Reg!

Calling YL's

Here's an OM who has been working only 40-meter CW and is a DX hound—and wonders why he hasn't met any YL's on the air. Tsk, Tsk! But he's building a Viking II so will soon be on all bands phone and CW. In the meantime he's looking for correspondents. He writes: "After reading your column of December and February, I couldn't resist putting in my two cents' worth. I am 15 years old, 5'10", and weigh 163. Also, I possess blue eyes and black hair. I like to play football, golf, swim and

(Continued on page 61)

The Oregon Amateur Radio Assn. convention at Salem drew this large group of YL's. Left to right, front row: W7ECC, 7QXH, ex-WH6ANP, 7NJS, 7RIC, WN7RVM, 7ITZ, 7FKS. Seated, center: W7HHH. Back row: WN7RZD, 7SPC, 7SJW, 7SBX, WN7SYF, 7ONM, 7GLK, 7FWR, 7NTT, 7RAX and 7QWX. Photo by WN7TLQ.



Horace Came Back!

As told to GLEN CARTER, WØMKS,
by DALE HILEMAN, WØMCB

I was there when they took Horace away. As they steered him backward through the door he thrashed his arms in the air and shouted, "Man the VFO! Short the interlocks! Run 'er up to a full gallon! Quick—call him before that W7 gets him!" Then as they opened the rear doors of the long, white car and urged him to enter, he turned to them and said with a sly wink, "Room enough in there for a couple of KW's, eh, OM?"

I learned later that on the way to the hospital Horace spied a flag pole in a school yard and

". . . Man the VFO! Short the interlocks! Run 'er up to a full gallon! Quick—call him before that W7 gets him!"

screamed, "Wow! Look at the size of *that* whip, will you! Quick—give me the mike!" He seized the attendant's stethoscope and called, "Hello, CQ CQ CQ . . . CQ CQ CQ . . . CQCQCQ to any mobile station whatsay?" He then threw the stethoscope aside and began twisting and tugging the buttons on the attendant's white coat. Scarcely hearing one signal, Horace moaned, "How in hell do you put this thing on 75 meters?"

No, Horace's condition was not, as you might suppose, the result of a fruitless attempt to TVI proof a Command Set in a fringe area. Actually, he had phenomenal success with everything he built—even back in State Flunkem Tech when I watched him fire up his rig (a 1R5 ECO driving a 3S4 final, running 0.05 watts to the bedsprings). The first CQ on 80 meters brought a 579X from a station in Kenya Colony, South Africa. After that first QSO, Horace became so absorbed in transmitter design that he spent less and less time at his regular studies in communications engineering.

But he managed to graduate—somehow—possibly because he threatened from time to time to expose the Dean's membership in the Local Electrician's Union.

Horace and I then went to work for a company that manufactured gadgets for TVI reduction (low-pass filters, high-pass filters, de-Q'd ground loops, etc.). Horace's first contribution to Ham Radio was a note in the company suggestion box: ". . . TS cards for Hams to distribute to complaining TV viewers."

At his new job, Horace was in Ham's paradise. All day he ecstatically applied a soldering gun to Ham gear. After work he rushed home and hammed 'til the wee hours or until he became too tired to blast out with another CQ.

Horace lived in a three-room apartment—converted to a Ham radio station. The living room was his shack, and the bedroom was used for a library—the floor piled with mounds of dog-eared radio magazines and dusty textbooks.

The kitchen contained a refrigerator, which was stocked with an alarming supply of canned and

A momentous occasion—graduation day at State Flunkem Tech.

lled beverages. Horace visited the refrigerator ween QSO's or whenever the band dropped out. here was another room in the house, to which the und bus ran, and to which Horace also ran ediately following the 73 of an especially long).

lorace invited me over one night to show me his antenna tuner. As I stood before the entrance his shack, he chortled, "Come on in. Careful, gh. Step where I step. Watch the wires with tracers—three thousand volts on 'em."

he shack was a dream-world menagerie of chassis, s, transformers, tools, condensers, resistors, hard- e—and especially cables.

s I followed Horace, roots and vines of wire en- led my feet. Dangling patch cords slithered it my neck. War-surplus antenna sections—like grass—threatened to impale me should I trip fall. A dim light in one corner of the room monstrous shadows of open-jawed alligator , gnarled and twisted cables, misshapen coils, , bolts, and terminal strips crunched beneath feet like jungle insects. A hissing radiator filled room with clouds of steam.

an attempt to dodge a co-ax feed line I dis- ed a stack of cardboard containers and caused undering avalanche of 807's and 1625's. When air cleared, Horace's voice came through the le: "It's all right, old man. Tubes were gassy ow. Besides—four hundred new 807's in the t. No harm done."

fter proudly describing his antenna tuner in s of the Fourier series, Horace guided the way he kitchen. There I noticed what appeared to new gas range. "I suppose you do your own king," I said, whereupon Horace opened the oven with a flourish. Inside was his 10-meter rig. Stove makes a fine TVI shield," he said.

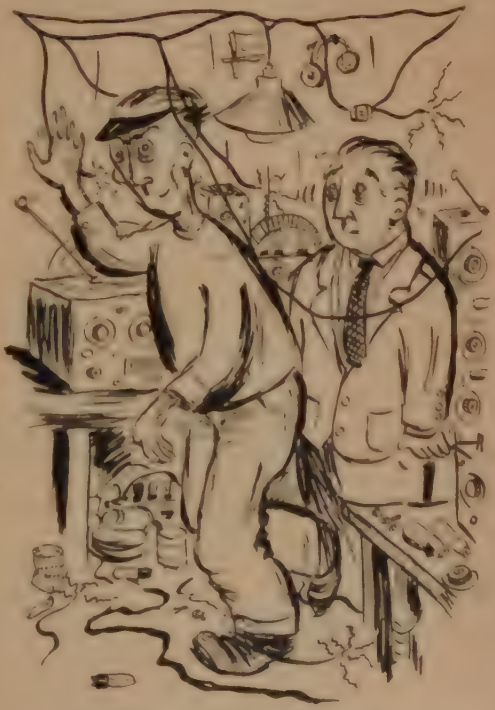
In the weeks that followed, Horace's preoccupation with Ham radio became more intense. Each morning at work he greeted his co-workers with, "Well, how's 80, 75, 40, 20, 15, 10, 6,—and what do you hear above 10 centimeters?"

I became worried about Horace. I suggested he find some kind of diversion—some entertainment, perhaps—like a girl friend. At first he was reluctant, but finally he consented.

The YL was a cute blonde and the occasion was the company's annual dance. Everything was going fine. Horace danced well, and seemed to be enjoying himself. Then, halfway through a bunny-hop, he had a brainstorm about his regenerative pre-selector. His eyes flickered with inspiration. As though speaking to somebody across the dance floor, he blurted: "I'll bet I'd get more out of her if I tried a tickler on the bottom end!" The young lady gasped, paled, whirled about, stalked from the dance floor and out of Horace's life.

Horace's preoccupation showed up even when he was not at work or in the shack. I was with him one day when he was making a purchase at a drug store. When the clerk delivered the package, Horace leaned over the counter, pumped the astonished clerk's hand, and said, "Fine business, OM! Thanks very much, 73 and we hope to be seeing you again!"

It was that afternoon I phoned the men in the white coats to come after him. I was watching him operate. He was in QSO with a W3 who insisted that the easiest way to load the final was to detune the plate tank. Horace became so excited in his anticipation of a reply that he couldn't wait for the W3 to sign. Suddenly he threw open the window and cried at the top of his voice, "No, no, no! Don't do it, you fool! You'll wreck the tubes! You've got



". . . Step where I step. Watch the wires with the red tracers—three thousand volts on 'em."

". . . A QSO with a W3 who insisted that the easiest way to load the final was to detune the plate tank."

to eliminate the reactance—use your antenna tun
He sprang to his receiver, jerked open the c
and shouted into the cabinet: "Dip the final be
it's too late—quick, before the plates melt!"

I edged out of the room and toward the teleph
I knew there was nothing further I could do. Ho
was my friend, but this was it.

As the weeks passed 20 meters picked up and
DX came rolling in. I thought how Horace w
like to be on the air now (even though he alr
had WAS and WAZ). But I knew that where
was they wouldn't let him have any radio gear.

Well, I was tuning 40 CW the other night, a
caught the tail end of a transmission that sou
remarkably like Horace's fist. Curious, I zeroe
called IMI a couple of times. Sure enough—t
booming in with an S9+ signal, was Horace!

"GUD TO HEAR U ON AGN," he said. "TI
ID NEVER GET SET UP HR CUZ THEY WU
LET ME HAVE MY RIG BT SO I TORE INT
COUPLE OF AC DC SETS AND FOUND
HAD A PURTY HOT LOCAL OSC BT CONVE
ED RADIOS TO 40 MTRS BT NOT MUCH P
BUT WRKED ALASKA SATURDAY ES US
BARS ON THIRD FLOOR WINDOW FOR
TENNA BT MIGHT WIRE UP MY PORTA
TYPEWRITER ES WRK TELETYPE BUT HI
NOT ENUF GUYS ON TELETYPE BT GO
QRT ES HIDE RIG CUZ THEYRE CUMING
MY DINNER BT WL LUK OM 73 TNX VY MU
ES HPE BE CNUAGN SOON AR."

Field Day is for the Birds!

The heron is a lovely bird,
It stands upon one leg.
The robin sings a pretty song,
And lays a pretty egg.
But of all the birds that take to air,
Within the ken of man,
The W6 is past compare,
Outdo him if you can.

The species is prolific, yea!
In spite of TVI,
The W6's fill the air,
And daily multiply.

Cacaphony of voice and code
Prevails throughout the year.
When migratory, he can load,
And does, on mobile gear.

This native bird of western state,
Indigenous to wave,
Delights in microphone or bug
From ticket to the grave.

Gregarious as he may be,
This contact-happy bird,
He soars to new-found ecstasy
When Field-Day haunts are stirred.

In June this vast awakening
Brings all the birds around.
The W6's take to air
And head for higher ground.

Atop all mountains in the west,
The flocks make haste to roost.
A week before the gruelling test,
All heaven and hell are loosed.

Aloft, o'er unpaved roads they swing,
These birds of single feather,
And tons of gear can't clip the wing
As they forge on together.

The ranchers watch them through the gate,
The fowl and cattle stare.
The W6's follow fate:
They MUST get on the air.

When they have gained their aerie nest,
An eerie camp indeed,
They glorify the rocks and trees,
And dedicate each weed.

To one sublime and timely goal,
Each acolyte anoints.
Each bird is part of the Field Day Whole.
Ah, birds! Bring home the points!

The W6's seek DX,
Their call creates a din.
But W6 works W6:
THAT'S ALL THAT'S COMING IN!

Helen V. Ferguson
XYL of Fred Ferguson, W6

Ionospheric Propagation Conditions

Forecasts by GEORGE JACOBS, W2PAJ

144-40 72nd Ave., Flushing, L. I., N. Y.

General Propagation Conditions

6 Meters DX Nil—Occasional Sporadic E openings up to 1200 miles.

10 Meters DX very poor with a possible opening to South America. Frequent Sporadic E openings up to 1200 miles.

15 Meters DX poor to fair but improving. Frequent Sporadic E openings up to 1200 miles.

20 Meters DX Fair to Good.

40 Meters DX Fair and improving.

80 Meters DX poor to fair, band noisy but improving.

160 Meters DX very poor, band noisy.

This overall picture of band conditions is intended to indicate qualitative changes in each band from month to month. For specific times of band openings for any particular circuit, refer, as usual to the *Propagation Charts*. It has been called to my attention, that unfortunately, in certain areas, due to the mails, etc., *CQ* is received after part of the month has elapsed and therefore the *Propagation Charts* may lose some of their value. Beginning this month, I have modified my calculations somewhat so that the *Charts* may be valid until the 15th of the succeeding month. This month's *Charts*, therefore, while primarily intended for the month of August, can be used as a guide for working DX right up to September 15th.

During August, and well into September, atmospheric noise levels continue at their high summer values. Sporadic E (short-skip) occurrence continues at a high rate during August and, generally, starts to decrease during September.

Recent Trends in Radio Propagation Research

While we have accrued a considerable knowledge concerning the propagation of short waves during the past thirty years, there remains a shroud of mystery concerning many aspects of this phenomenon. Scientists and Engineers are continuously investigating the solar system and the earth's atmosphere in the hopes of solving nature's secrets concerning the ionosphere, sunspots, aurora, ionospheric disturbances, sporadic E, etc. As we learn more about these effects upon radio communication, new operating methods can be devised and improved.

There were two significant meetings held recently at which Scientists and Engineers discussed the results of present research in the field of Radio Propagation. I attended both these meetings and would like to briefly relate some of the topics discussed that should be of interest to most Amateurs.

During April 27-30, 1953, a joint meeting was held at the National Bureau of Standards, Washington, D.C., between the International Scientific Radio Union and the Professional Group on Antennas and Propagation of the Institute of Radio Engineers. Interesting papers were presented on the following subjects:

Radio Astronomy

The study of the Sun, Moon and stars continues to unearth new evidence of the effects of these bodies upon radio propagation. Mr. A. G. McNish of the National Bureau of Standards delivered a paper entitled, "Effects of the Moon on the Outer Atmosphere," which indicates that the moon may contribute to the variation in the earth's magnetism which in turn has an effect upon radio conditions.

Possibly more important to Amateurs, especially those interested in the VHF range and beyond, is the fact that considerable information about the sun and other celestial bodies is obtained by observing radio waves which actually emanate from these bodies. A paper entitled "Radio Studies of Sun and Moon with High Resolution Antennas," was given by Hagen and Sees of the Naval Research Laboratory. They have developed a device for studying natural radiation originating from the sun and moon. This device consists of super-heterodyne radio receiver tuned to approximately 35 **kilomegacycles** (a wavelength of 8.5 millimeters!!), and a specially designed parabaloidal reflector having a pencil beam width of four minutes of arc between half power points.

Mr. Takeo Hatanaka of Cornell University described progress being made in the investigation of solar radio bursts occurring near the Amateur two-meter band (200 Mc.). The solar source of this noise is being determined as well as the band widths of the bursts.

Terrestrial Radio Noise

While radio radiation of a celestial origin may be responsible for noise at VHF and beyond, terrestrial or atmospheric radio noise is one of the most important factors that limit radio communications in the low, medium and high frequency ranges. A better understanding of the origin and nature of terrestrial radio noise will make it possible to design communication systems of higher circuit efficiency.

A period of good short wave propagation conditions is expected from August 12-20. Ionospheric disturbances will most probably occur during August 4-6, 10, and 22-25.

A continuing study of the characteristics of terrestrial or atmospheric radio noises emanating from lightning discharges, was jointly reported by the University of Florida, the New Mexico Institute of Mining and Technology and the Lightning and Transients Research Institute. Some of the propagational processes of atmospheric noise produced by lightning discharges are being studied with the use of Artificial Lightning Generators.

Ionospheric Radio Propagation

Research of the past thirty years has given us an understanding of the ionosphere that has permitted the development of world-wide radio communications. While it is now generally believed that for the most part, the ionosphere is produced by ultra-violet radiation from the

(Continued on page 60)

ALL TIMES IN E S T

EAST COAST TO: (Centered on Washington, D. C.)	15 Meters	20 Meters	40 Meters	80 Meters
Scandanavia	Nil	0630-1300 (2-3) 1300-1730 (3-4)	1900-0130 (1-2)	2000-0000 (1)
Great Britain & Western Europe	1200-1500 (0-1)	0500-1400 (3-4) 1400-1600 (4) 1600-1830 (2-3)	1830-0130 (3-4)	1930-0030 (2-3)
Balkans	1400-1600 (0-1)	0600-1400 (1-2) 1400-1700 (2-3) 1700-1830 (1-2)	1900-0030 (1-2)	2000-2300 (0-1)
Central Europe	1400-1700 (0-1)	0600-1400 (2-3) 1400-1730 (3-4) 1730-1930 (2)	1900-0000 (2-3)	2000-2300 (1-2)
Southern Europe & North Africa	1400-1730 (1)	0530-1500 (3-4) 1500-1730 (4) 1730-1930 (1-2)	1900-0100 (3)	2000-0000 (2)
Central Africa	1500-1700 (1)	0600-1400 (1) 1400-1600 (1-2) 1600-2100 (2-3)	1900-0000(2)	2000-2330 (1)
South Africa	1200-1400 (0-1)	0600-1300 (0-1) 1300-1500 (1)	1930-0030 (1-2)	2030-2330 (1)
Near & Middle East	1330-1530 (0-1)	0600-1330 (0-1) 1330-1600 (2-3) 1600-1730 (1-2)	1930-2330 (1)	2000-2300 (0-1)
South America	1500-1700 (0-1)* 0700-1200 (1) 1200-1600 (2) 1600-1900 (3)	0600-1600 (1-2) 1600-1800 (2-3) 1800-2000 (3-4) 2000-0100 (2)	1900-0500 (2-3)	2000-0400 (1)
Hawaii	1600-2100 (1)	1100-1700 (1-2) 1700-2200 (3)	2100-0400 (3) 0400-0730 (1)	2300-0500 (1-2)
Australasia	Nil	1600-2000 (0-1) 2000-2230 (1-2)	0000-0730 (2)	0100-0630 (1)
Guam & Pacific Islands	Nil	0800-1100 (2-3) 1400-1900 (0-1) 1900-2200 (2)	2330-0700 (2)	0130-0600 (1)
Japan	Nil	0700-1000 (1-2) 1600-2100 (0-1)	0200-0700 (0-1)	Nil
Philippine Islands & East Indies	Nil	0800-1100 (1)	Nil	Nil
India	Nil	0700-1300 (0-1) 1300-1500 (1)	1830-2000 (0-1)	Nil

ALL TIMES IN C S T

CENTRAL USA TO: (Centered on St. Louis, Mo.)	15 Meters	20 Meters	40 Meters	80 Meters
Great Britain & Western Europe	1500-1600 (0-1)	0600-1400 (3) 1400-1600 (3-4) 1600-1800 (1-2)	1830-0030 (2)	1930-2330 (1)
Central Europe	1500-1600 (0-1)	0700-1400 (2-3) 1400-1630 (3) 1630-1830 (1-2)	1830-2300 (2)	2000-2230 (1)
Southern Europe & North Africa	1400-1630 (1)	0500-1430 (3-4) 1430-1630 (4) 1630-1800 (1-2)	1830-0100 (2-3)	1930-0030 (1-2)
Central Africa	1430-1600 (1)	0500-1400 (1) 1400-1530 (1-2) 1530-2000 (2-3)	1830-0030 (2)	2000-2300 (1)
South Africa	1100-1300 (0-1)	0500-1200 (0-1) 1200-1400 (1)	1900-2330 (1-2)	2000-2300 (1)
Central America & Northern South America	1500-1800 (1)* 1200-1900 (2)	0600-1600 (3-4) 1600-2000 (4-5) 2000-2200 (2)	1730-0500 (4-5) 0500-0630 (2-3)	1830-0430 (2-3)
South America	1300-1600 (1)* 0800-1100 (1) 1100-1300 (2-3) 1300-1900 (3-4)	0600-0800 (3) 0800-1600 (2) 1600-2200 (4) 2200-0200 (2)	1830-0430 (3)	1930-0330 (1-2)

ALL TIMES IN C S T

CENTRAL USA TO (Centered on St. Louis, Mo.)	15 Meters	20 Meters	40 Meters	80 Meters
Hawaii	1700-2100 (1)	1000-2000 (2-3) 2000-2300 (3-4)	2200-0800 (3-4)	2300-0530 (3)
Australasia	1600-2000 (0-1)* 1400-1800 (1-2) 1600-2100* (2-3)	1200-1900 (1) 1900-2030 (1-2) 2030-0000 (2-3)	2230-0600 (2-3)	2300-0500 (1-2)
Japan	1600-1900 (1) 1900-2200 (2)	0800-1900 (2-3) 1900-0030 (3-4) 0030-0200 (1-2)	0030-0530 (3)	0130-0430 (2)
Philippine Islands & East Indies	1900-2200 (0-1)	0700-1000 (2) 1300-2200 (0-1) 2200-0100 (1-2)	0300-0530 (0-1)	Nil
Malaya	1900-2200 (1)	0700-1030 (1-2) 1500-2300 (0-1) 2300-0100 (1)	0500-0700 (0-1)	Nil
Marshall Islands	1800-2100 (1)	1000-1900 (2-3) 1900-2230 (3-4) 2230-0100 (2)	2300-0630 (3-4)	0000-0600 (2)
Guam & Mariana Islands	1900-2200 (1)	0700-0900 (2) 1100-2000 (2-3) 2000-2300 (3-4) 2300-0100 (2)	0030-0430 (2-3)	0100-0400 (1-2)
Hong Kong, Formosa & Macao	2000-2300 (0-1)	0700-0900 (1-2) 1200-2100 (1-2) 2100-0100 (2-3)	0300-0600 (2)	0330-0530 (1)
Australasia	1700-2100 (1)	1500-2000 (0-1) 2000-2200 (2)	2330-0630 (2-3)	0100-0600 (1-2)
Japan	Nil	0700-0900 (1-2) 1400-2100 (1) 2100-2300 (1-2)	0200-0630 (1)	0300-0600 (0-1)
India	Nil	1900-2100 (1) 0800-1400 (1)	1900-2000 (0-1) 0400-0630 (0-1)	Nil
Philippine Islands & East Indies	Nil	0700-1000 (1-2) 1000-1930 (0-1) 1930-2100 (1)	0400-0630 (0-1)	Nil

ALL TIMES IN P S T

WEST COAST TO (Centered on Sacramento, Calif.)	15 Meters	20 Meters	40 Meters	80 Meters
Europe	Nil	0700-1300 (1) 1300-1600 (2)	1900-2300 (1)	2000-2130 (0-1)
South Africa	1300-1500 (0-1)	0600-1300 (0-1) 1300-1800 (1-2)	1830-0000 (1)	1900-2200 (0-1)
Central America & Northern South America	1300-1700 (1-2)	0600-1600 (3-4) 1600-1900 (4-5) 1900-2100 (1-2)	1830-0330 (4) 0330-0500 (2-3)	1930-0330 (2-3)
South America	1500-1700 (0-1)* 0900-1300 (1) 1300-1830 (2-3)	0600-1400 (1-2) 1400-1700 (2-3) 1700-1930 (3-4) 1930-2300 (1-2)	1900-0300 (2-3)	2000-0230 (1-2)
Siberia	1800-2100 (0-1)	1200-1900 (3) 1900-2300 (4) 2300-0100 (2)	0000-0500 (3-4)	0100-0400 (2)
India	1900-2100 (0-1)	0700-1100 (1) 1700-2000 (0-1) 2000-0000 (1)	0300-0700 (0-1)	Nil

Symbols For Expected Percentage Of Days Of Month Path Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

*Indicates time of possible ten-meter openings.

Gathered by DICK SPENCELEY, KV4AA

Box 403, St. Thomas, Virgin Islands, USA.

Our heartiest congratulations to the following stations upon achieving WAZ:

No. 286 CR9AH John J. Alvares 40-131
No. 287 W3BHV Russell E. Banker 40-222

We don't recall ever having seen any Ham activity in the movies (cinema to you, old boy) and it seems a shame that this medium has been overlooked in publicizing our hobby.

Here's an idea MGM can have for free (while CQ's salaries could stand examination by the NRLB and ASPCA, we are public spirited).

Our scene opens in a lonely farmhouse at Hoedown, Neb. showing Clem Hinkledinker (Van Johnson) pounding brass with a rapt expression on his puss. T9 code is heard (let's make it real code and not the meaningless jumble of dots usually heard in these epics). The send-receive switch is thrown, Clem grabs the phones with both hands and registers a look of severe concentration as the scene changes to darkest Africa. Here we see a round grass hut with a six element beam shooting out of the peaked roof. Our camera now takes us through the door and shows us M'bi M'gumbo, OQØXX (Al Jolson), seated before a Collins KW1. A couple of soup bones adorn his hair and a yard wide smile creases his pan. More code is heard punctuated by a couple of honest to goodness QRX's while M'bi ducks out the door to chuck a spear which chases the monkeys off his beam. Now we return to Clem, who hears a mighty pounding at the door. Farmer Jones (C. Aubrey Smith) dashes in to inform Clem that his daughter MaryJoann (Lana Turner) has contracted a rare tropical ailment which only the sap of the African Jujub tree can cure. (Some of the suggested actors may now be out of circulation but we get movies very late down here.) From here on in there can be no doubt of the outcome. M'bi furnishes the sap which is flown from Elisabethville in practically no time at all and Mary Joann marries Clem just as quickly; in fact, the twins M'bi and M'gumbo, age ten months, are now up to eight WPM.

All is not beer and skittles, however, as variations to the theme may appear. For instance: Cyril Snide (Gregory Peck), enraged because Clem would not pass him on the Class C code test, sneaks into Clem's shack during the corn planting season, removes the condenser connections from Clem's filter and sends out a 25 minute T5 CQ on 13,995 kc. Clem returns and catches him as he is signing off and a terrific skirmish occurs which is finally terminated when Clem clouts Snide with a spare transmitting variable condenser which leaves Snide looking like he was behind bars (where he should be, of course). At this moment the FCC RI (Maxey Rosenbloom) rolls up on his periodic ten year visit, whereupon Snide confesses and the resulting FCC tickets are quashed.

THE END.

Jimmy, LX1BO, is shown here at Radio Luxembourg. He has worked over 1000 W's on 28-Mc Phone, and has 600 QSL's to show for it. (Photo courtesy DL4LQ)

At Time of Writing

NIUE, ZK2AA: For those needing a ZK2 contact we have the following good news: Prior to his departure on November 4th, Bill, ZK2AA, will be on the air daily from June 22nd to October 15th on 14,090 kc. from 0400 to 0415 GMT, dispensing contest style QSO's. During this period please do not call ZK2AA unless you have NOT worked him before and limit your contact to a simple RST report. QSL's for this operation should go via W6MLR who will answer same via bureau.

G2RO VQ1-9: ZC4IP informs us that G2RO is touring Africa with a QRP rig and has already been on the air as VQ3RO, VQ4RO and VQ6RO. On June 7th his plans called for operation at VQ5RO and subsequent activity at VQ1RO and VQ9RO with the possibility of appearing in other rare spots.

QATAR, MP4ABW: This station has been active on phone around 14,110 kc. and has been heard in Europe with good strength at 0500 GMT.

JOHNSON ISLAND: W6TUX/KJ6: This is an apparent [illegible] with W4CEN at 0300 GMT on 14,080.

ST. PIERRE, MIQUELON, FP8AA/FP8AK: These two FP8 veterans, W3BXE and W2BBK, plan to appear on St. Pierre around July 4th. All band operation (3.5, 7, 14 and 21 Mc.) will take place. The latter two bands will be used mostly during daylight hours.

EASTER ISLAND CEØAA: Continuing our Easter Island serial we quote from a QSO with CE3AG on June 13th: "Talked with the Minister of Marine this morning and he told me that the S.S. Angamos will be at Valparaiso from southern trip in two or three days and if the ship is in good condition the trip to CEØ-land may be fixed for about June 22nd. I will know exact date next week. All equipment has been tested and works FB." (This dates CEØAA's probable appearance around July 2nd.).

CRETE, SVØWP/SV9: This station was active, A3, from Xania, Crete, during the nights of May 18th and 19th and some 130 contacts were made in 20 odd countries. No W stations were heard or worked. Ray SVØWP/W2DZM/W5NRP, also advises that SVØ calls are issued to all foreigners and that the call of SV5UN, now SVØWG, was used by the gang on Rhodes through a misunderstanding. YU1AD says several YU's are interested in a Ham expedition to Crete whenever possible and that YU2AI has offered the use of his 32-V-1 xmtr and 75-A receiver for the purpose.

PAKISTAN, AP2R: Ray, AP2R/G3GJQ, advises that he has taken [illegible] and cards may be sent to the address given in the QTH column. AP2R may be found on CW around 14,075 kc. at the following times: 0200/0300, 0600/0730 and 1500/2000 GMT. He is on phone 14,200 kc. between 0800/1300 and 1500/2000 GMT. Other licensed stations are AP2L, AP2N, AP2K and AP5A. UN stations such as 4UAS, 4UAJ, AP4UN etc. have now been officially closed. AP2L operates on 21 Mc. Altho the 7-Mc noise level is high Ray will give anyone a QSO on that band upon request.

FRENCH OCEANIA, FO8AI: Jack FO8AI/WØNAK, whose twenty-five watter has been putting a potent signal into these parts, advises that he made 240 QSO's from the Marquesas and about 250 from the Tuamotus. In each case he was operating on shore. From now on, due to his land based power supply being damaged by salt water, operation will be from his 34-foot sailboat which is presently anchored at Vaiere-Moorea. FO8AI is licensed for fixed location only, so will not be heard while underway. There is a chance that Jack will hit VR3 this Fall and give us a CW crack at this spot. He is also interested in Clipperton but this one will have to be left for a future trip. (We are not too clear on what constitutes a legal QSO in cases like this but having one end of the antenna tied to the island should make it pure.)

FLETCHERS ICE ISLAND, KF3AA: W2PGG and W6HIK, who operated this station from March to June, have now returned stateside after some 300 contacts on phone and CW. W2PGG has the logs and QSL's may be sent to his home QTH. Thanks go to W2LXP, W9NZZ, VE8MC and other stations who so kindly helped with the heavy traffic load. No mention was made about future operation at KF3AA.

COCOS ISLAND, TI9UXX: (Via TI2TG) A license to operate on Cocos was granted W6UXX on May 25th. He hopes to be on by the end of September, October or November. This one may not be too easy as QRP will be used and only a few hours will be spent there. We are keeping our ears crossed.

SEYCHELLES IS, VQ9MR: This station appeared for three days around March 23rd and was worked by a good number of Europeans including DL7AB, OE1CD, G6ZO and G2PL. QRI was T6 with lots of drift. QTH was given as Mahe, Seychelles, and the name as Brin. QSL's are awaited as final proof on this one.

BHUTAN, AC5XA: This station has been reported as active by VK3CX. No reports from other sources as yet.

CHRISTMAS ISLAND, ZC3AA: A signal signing this call has been worked by W4LZF, WICWX and others on 14,020 kc. Our opinion is that his timing is good but legality doubtful. Hope we're wrong. He hasn't been heard out VS6AE way.

ERITREA, ET2: Confederation between this country and Ethiopia went into effect at 0000 GMT, June 1st, and all calls were changed from MI3 to ET2, e.g., MI3AB is now ET2AB (Ethiopia is ET3). According to ET2AB Eritrea has a separate government under the Ethiopian crown and we see no reason why it should not continue as a separate country. First contacts with ET2 a few minutes after the changeover were noted with ET2AB in the following order: I1AIV, KV4AA, W8WZ, W8JBI, W8DMD, W2UNR and W9GWK.

HONDURAS, HR1UA, HR1JO: Both these stations should be active now on 14-Mc CW. HR1JO runs a Globe King Xmtr. See QTH's

ITEMS IN GENERAL: W6RW reports KC6AA active on 14,106 CW . . . ZA3B has been worked on 7020. Says QSL via 9S4AX (??) . . . LZ1KAB advises that 9B3AA is QRT "forever" . . . VS2's may soon have their calls

changed to 4S7 . . . OQ5CP may set up shop in OQØ . . . Via VR3C we hear that PR3WI is NG . . . CP1CB should be on now with a Viking II and 75A2, A3 mostly. See QTH's . . . KAØIJ apparently has new ops and has been active on 14060 0700/1300 GMT . . . G2PL heard W1FH working VU5JA!! . . . From KH6KS we are told that Otto Hornung, caretaker on Palmyra Island, has passed his Novice exam. and is up for Gen. class license. He was due back in KP6 in June . . . VR3C skeds KH6OR, A3, each Wednesday 0500 GMT . . . ex-VQ8CB, Leny, is now VQ8AB. No activity is reported from Chagos Is. now . . . VS9GV was heard giving his QTH as, Nicio, c/o Aden Airways, Aden, 14,070 . . . PIILS is op aboard the Dutch Weather ship "CIRRUS" which patrols a bit of ocean about 300 miles west of Ireland. QSL via VERON . . . KB6AY, Fred, has been putting a good signal into the Caribbean area around 1200 GMT. 14065 Kc . . .

DX NOTES FROM F9RS: A station signing FN8AE may appear in Pondichery, French India, shortly . . . The present op of FB8ZZ promises to be active on the Ham bands . . . FK8AO, ex FQ8AE, is active, CW and Phone on 7 and 14 Mc . . . There is a possibility of FW8AB appearing on Wallis Island in July . . . F3RG, ex-FD3RG/FF3RG, will soon be a FB8 in Madagascar. He will concentrate on 21 Mc . . . FB8ZZ just dispatched the balance of his QSL's for W, VE, KA and KZ, via ARRL . . . Mac, FB8BB, returns to Madagascar in July . . . FQ8AI is in Bangui (Oubangui-Chari) FEA . . . All QSL's from ZD7A have gone out . . . Two new ones in FEA are FQ8AV and FQ8AW. See QTH's . . . FP8AP should be back in FP8 and FY7YC in Cayenne by now.

NOTES FROM THE WEST GULF BULLETIN: ZK1BG will be in the Cook Is. for three years. He is ex-ZL2AJT. QSL via NZART . . . FY7YE has been officially licensed in Fr. Guiana and is being fixed up with modulation equipment. He speaks English. See QTH's . . . VK1HM, Cocos, has Saturday and Sunday phone skeds with W8GZ at 0500/0600 GMT. QRG, A little above or below the phone band . . . VK1HM listens for W's each Sat. and Sun., 1330/1430 GMT on 14210

Neat set-up of DL4AY, Major Art Monsees (W7SOX) would be given the stamp of approval by any XYL. Art has worked 87 countries during his 14 month stay at DL4AY.

With FP8 activity again in full swing, Here's a photo of one of last summer's expeditions. L to R, FP8AL/WØFNO, FP8AM/WØAIW and FP8AN/WØUQV.

kc. and transmits on 14310 kc. . . . VK's report ZC2AC active.

NOTES FROM THE SO. CALIF. BULLETIN: A recen QSO with CR9AH reveals that CR1ØAA is still i Portuguese Timor. CR9AH is investigating to de termine what equipment is necessary to get him bac on the air . . . OY3IGO is active again on xtl, 702 and 14,054 kc. . . . VP2MD is on daily 14005/14018 0030/0230 GMT. QSL's go via W2BUV or upon re ceipt of a stamped, self-addressed envelope . . . ZP9AY and ZP5AY are active on CW. The former wa worked by W6CUQ at 0117 GMT, 14,036 . . . 5A1TN is on daily 14,035 kc. . . . From ZL1AH via W6NZW ZC3AA is enroute to Christmas Island with all gea aboard and expects to arrive around June 26th. H will be on 14-Mc CW and Phone . . . Clyde, WØELA VS5ELA, is contemplating another trip to the Orien next Spring.

Exploits

G6RH adds ZD7A and SVØWP/SV9 to reach 239 . . . Russ, W3BHV, nabbed his WAZ and 222 countries usin two surplus, 78 cent, 807's running 150 watts input an an "attic dipole." We think that's really sumpin!! . . . G6QB, Tommy, came up to date with a list that include VK1PN (Heard Is.), HR1RL, ZD7A and VP5BH. Thi gives him 221 . . . W6VE upped to 219 when Dewe nailed ZC5VS . . . OE1CD was also helped by ZC5V to 212 . . . G8IG went to 206 and 179 (A3) with th addition of 3A2AW and SVØWP/SV9 . . . W6UC stopped at 198 with VS1DA, FY7YC and 3A2AB . . . W7ENW added KAØIJ for No. 181 . . . 4X4RE cam

Honor Roll Endorsements

CW/PHONE		KP4KD	39-200
G6RH	40-239	W2SHZ	38-175
W3BHV	40-222	W9LI	37-151
G6QB	40-221	W5JUF	36-206
W6VE	40-219	GM2DBX	36-165
OE1CD	40-212		
G8IG	40-206	PHONE ONLY	
W6UCX	40-198	G8IG	39-179
W7ENW	40-181	CE3AB	37-186
CR9AH	40-131	W7MBX	37-164
4X4RE	39-220	W7MBW	37-112
W9FKC	39-207	W1MCW	36-202
VK4FJ	39-204	GM2DBX	36-163
W5FFW	39-200	W5JUF	35-171

Last complete HONOR ROLL appeared in the June issue.

Next complete HONOR ROLL will appear in the September issue.

Amnon Bar-Giora, 4X4DF, is no stranger to DX'ers. The QTH is Jerusalem.

up with SVØWP, SV9 and ZC5VS which puts Egon on 220 . . . Mike, W9FKC, got a free one in VS2CP for No. 207 . . . VK4FJ upped to 204 when Bax added VS9AW, ZS7C, VK1HM, FB8ZZ and ZD2HAH . . . W5FFW and KP4KD both reached the 200 level when Hal landed ZD7A, MP4KAC, KA0IJ, ZS2MI and ZC5VS, while Ev knocked off YI2AM and OD5BH . . . W2SHZ went to 175 with LU4ZI, SU1GG and ZK1AB . . . W9LI submits a modest 151 with the addition of ZS2MI, ZS9I, ZD2DCP and CR4AJ . . . W5JUF hopped to 206 and 171, A3, with such as ZC5VS, LZ1KAB, SVØWG (Rhodes), TF8SV and SU5EB . . . GM2DBX adds VS9AW, OY2Z, YJ1AB and F9QV/FC to reach 163, A3, and 165 . . . CE3AB embellishes his phone total with SV5UN, VR3C, FP8AI, M1B and VR4AE which puts Luis on 186 . . . Les, W7MBX, A3'd with KV4AT, ZS7C, AP2R, VS2BS and OY2Z to reach 164. He also raised W7MBW's phone total to 112 with EA8AU, GC2RS, 3V8BB and HH3DL . . . Mrs. Lou, W1MCW, used FB8ZZ and FC9QV to catch up with W1NWO on the 86-202 phone spot . . . Miles, W6ZZ, reports cdx poor but keyed with JA's 1AO, 1BN, 1CR, 2AH, 2AZ, 5AA, 5AG and DU's 7SV and 1FC . . . W3KT and W3OCU nabbed VS9AD during his trip to Sult. of Oman . . . Joe, W6GPB worked ZC5VS for a new one and rec'd WAA Certif No. 76 and WAF No. 52 . . . W8EKK added three in OD5XX, KB6AY and ZK1AB . . . CE3AB reports an interesting 80 minute round-table phone QSO with ZS6H, ZS2ND and VU2EH on May 21st . . . ZC5VS nabbed his first W4 in W1CEN. Hugh thought he was JA1CEN at first! . . .

New Reporting System for Phone Operation

An Administrative Committee recommendation from the recent IARU, Region 1, Congress meeting held in Lausanne in May is as follows: Radio Telephony (AM) transmissions shall be rated on terms of the 'RSM' code.

'R' standing for Readability.
'S' standing for Signal Strength.
'M' standing for Modulation Quality.
The 'M' reading shall comprise the following five steps.

M1—Unintelligible Modulation.
M2—Bad Modulation due to spurious parasitic oscillations or to causes unknown.
M3—Bad Modulation due to frequency modulation of the carrier.
M4—Bad Modulation due to overmodulated carrier.
M5—Good Modulation not exceeding 100 per cent.

(Thanks to PAØLR)

21 Mc. Standings

DL7AP	81	W4COK	66	G2VD	55
G8ZO	80	PA0KX	65	G5BZ	55
PA0JJ	79	G6QB	64	G2BJY	55
DL7AA	77	W1BUX	62	W0HVN	55
G3GUM	76	G6GN	62	W1RY	54
TI2TG	71	G8II	61	DL3BJ	53
DL3RM	70	PY4RJ	60	ZE3JP	52
W4KRR	69	FA8IH	59	OZ2PA	52
DL7BA	69	KV4AA	58	TI2RC	51
DL1FF	68	KP4KD	56	G8KP	50
W3AYS	67	W2WZ	56	W5VIR	50

Please keep us informed of your standing.

W8JGU keyed with OQ5GU, FF8GP, OE13RN and then A3'd with HR1KS . . . W1DSF is up to 140 with 116 confirmed. Frank visits KH6 in July . . . W1CWX nabbed HE1C, VS2CP, C7AZ and CR6LU . . . W4TM pulled in AP2R and FO8AI . . . CP1BX went to 67 with FF8AG and worked Olga, CX3CU, for her first CP contact . . . ZP5AY was No. 199 for Mirko, YU1AD . . . W9GWK hooked ZC5VS on a "CQ DX"! . . . KH6ARL keyed with ZK1BG, 11CZE, YN1OC, KV4AA, HP1BR and DU7SV on 14 Mc.

Here And There

W2BBK still gets letters regarding FP8AK QSL's. All of these have gone out via Bureaus. FP8AQ is QSL'ing direct for some 600 phone QSO's of last year but has not quite got them all cleaned up as yet. Doc, W2BBK, figures he can make 4000 QSO's from FP8AK/FP8AA during his three week stay this year, starting around July 6th, if the demand is anything like last year . . . FA8IH visited Paris in May and had personal QSO's with FR7ZA, FK8AH, FK8AL, FI8AC and FB8ZZ . . . KV4AA logged visits from W3TSG, KP4NO, KP4JE and W9IEF . . . G6QB now has TVI-proof 807's running 120 watts . . . FF8AG will QRT in July and return to France in August . . . F7AX is W2WPO . . . MP4BAU's new 14-Mc rig should be on the air by now. See QTH's . . . W3CHH, ex-W3CHH/Iwo, advises that he still has a few Iwo QSL's left should any be needed . . . W1HX has the old three-element beam back up again . . . W1YHC, ex-W7RND, is at Keflavik Airport, Iceland but expects to be signing /VO2 at Pepperell AFB as this is read . . . ZL2LB recently mailed out some QSL's for VR5PL. Some of them were covering QSO's of '49 and '50 . . . Should the proposed ABC-Z Award go into effect KP4KD claims the following totals: 3.5-41/15, 7-84/24 14-192/39, 21-55/21, 28-60/22 which gives him

This cheerful gent is none other than FB8BB, Mac, of Boanamary, Madagascar. Mac, who is old F9ET, really put Madagascar on the Ham radio map. Photo courtesy of W1NWO.

NEW DX QTH'S

AP, Pakistan QSL Bureau—Cpl. Roy Handley, Box 2002, Karachi, Pakistan.
CP1CB—Larry Callaway, c/o U.S. Embassy, La Paz, Bolivia.
FK8AO—Georges Birepinte, Box 23, Noumea, New Caledonia, Oceania.
FQ8AI—Capt. Henry Freccero, Camp de Repos, Base aerienna de Bangui, Oubangui-Chari, FEA.
FQ8AV—Louis Le Cocq, Box 69, Fort Lamy, Tchad, FEA.
FQ8AW—Pointe Noire, Moyen Congo, FEA.
FY7YE—Mario De Lepine, B.P. 60, Cayenne, Fr. Guiana, S.A.
HR1JO—Jack Overton, USAF, c/o U.S. Embassy, Tegucigalpa, Honduras.
KA8RC—Roger Chandler, 24th Sig. Co., APO 24, PM, San Francisco.
KA8TB—T. F. Black, FEC/LN, 8240 AU, APO 309, PM, San Francisco.
KZ5-Bureau—KZ5BS, Bob Sullivan, Box 191, Diablo Heights, C.Z.
ex-KW6BC—J. Banks Sr., 1720 Ala Moana, Honolulu, TH.
MP4BAU (From QSL card)—Adi G. Lawyer, c/o Petroleum Developments Ltd., Ummsaid, Qatar. Via Bahrein, Persian Gulf.
SVØWP (SV9)—Major R. F. Hoffman, 0-44240, USASG, JUSMAG, APO 206, PM, N.Y.
VP6GT—George Taylor, Black Rock, St. Michael, Barbados, BWI.
VQ2FU—Box 199, Livingstone, Northern Rhodesia.
ZC4/Cyprus Bureau—Mrs. Barrett, Box 219, Limassol, Cyprus.
Thanks to—West Gulf Bulletin, HR1UA, KH6ARL, W4CEN, F9RS and W4THZ/4.

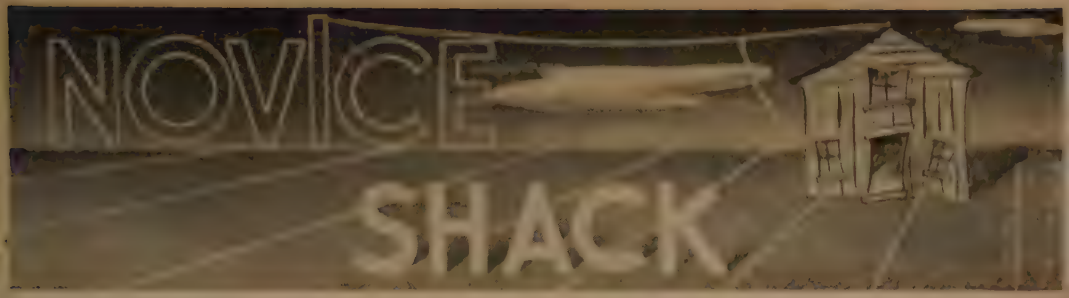
553 points and puts him in the ABC/Z 500 class. A similar compilation gives VK4EL 429 points as follows: 7-31/24, 14-175/40, 21-25/17 and 28-82/36 . . . W4THZ/4 seeks cards from FO8AC, CP1BK, CR7AX, FQ8AF, VR2BZ, ZK1AA and ZB1KQ . . . W6LEV is now K2DCA in East Paterson, N.J. . . . ZS2AT seeks a VE2JI QSL for zone 2 to complete WAZ. Any help? . . . KZ5BS is new QSL manager for KZ5-land . . . W5LUU is now K2CXE near Binghamton, N.Y. Jim is running 600 watts with a vertical . . . W2CTO, K2BU and W2ARE had a get-together on June 8th . . . HZ1MY, now in CN8 is experiencing some difficulty in having a 32V/75A setup shipped to him. All Dick's gear was sold when he left HZ-land and new gear is needed for that trip to Ifni. . . . LU5AQ says that LU4ZI was not closed down by the British but closed up shop, normally, on Dec. 31st, 1952. He was replaced by LU3ZO and others . . . DL1AU and DL9PR closed HB1AG/HE on May 17th after nearly 1000 contacts on 3.5, 7 and 14 Mc. . . . New Officers of the So. Cal. DX Club, as of June 3rd are as follows: Pres. W6RW, Vice Pres. W6BXL, Sec'y W6HPV, Treas. W6NZW, Directors W6AOA and W6BUD . . . KG4AF should be on with a W4 call from Winston-Salem, N.C. by now . . . G3AAG paid a visit to W4DHZ

KV4AA and XYL, Anna, are here seen in front of the window through which the photo of the interior of the shack (below) was taken.

. . . G8FC is ex-VS1CW of '50 while F7BO is W8FNK . . . ZC4IP's XYL is taking over as QSL Mgr. for ZC4-land. See QTH's . . . Of W5JUF's 35 new ones, dating from Jan. 1, 1952, 6 were worked on Fridays, 10 were worked on Saturdays and 12 were worked on Sundays. The remaining 7 fell on other days so it looks like weekends are the time for DX . . . Jim, G6ZO, recently visited Madrid where he met EA4BH again and learned that the U.R.E. is taking an extremely dim view of EA9DC's behavior. The U.R.E. has been receiving dollar bills and letters of all sorts, but EA9DC just refuses to cooperate. The present EA8AW, on the air, has nothing at all to do with EA9DC and hates being pestered. Jim then had a quick visit with F8EO and F8EX. He is happy to state that the latter has fully recovered from his long illness while in Beyrouth (F8EX/AR8) . . . More on EA9DC comes from G2MI who made it a point to discuss this matter with the Pres. of the Spanish Society during the recent Lausanne meeting. He pointed out that EA9DC's attitude reflected detrimentally on Spanish Hams in general . . . ZC4RX enjoyed leave in G-land in June . . . KC6QY was slated to QRT at the end of April . . . VK4FJ still seeks QSL's from VP6AA, VP2LE, AC4NC, OQ5LY and

(Continued on page 66)

Operating position in the new 'shack' of your DX Editor may be seen at left. On the lower shelf the Beam Indicator. Select-o-ject, VFO-Exciter and two Electronic keyers are carried. The top shelf is held down by the HV Power Supply. Doubler and Final Amplifier. The Final runs 700 watts to PP 4-125A's and band changing is accomplished by moving a tray of five coils to the proper positions. The flowers on the HQ-129X are a standard feature in 'respect' for the numerous 'dead' bands encountered. A 200 watt 1.8 Mc. transmitter is in the adjoining room and is keyed from the operating table.



Conducted by HERB BRIER, W9EGQ

[redacted] St., Gary 3, Indiana

Third-party message handling is an important phase of amateur radio. Its simplest form exists when two amateurs are in radio contact and one asks the other to say hello to a friend for him. When the second operator does so, he has handled an informal third-party message.

Such informal messages do not require any particular form or procedure in handling. Important ones, however, such as the thousands sent between men in military service and their families, and emergency messages resulting from floods, tornados and similar disasters, require more formal treatment. One reason for this is that they are frequently "relayed" through several stations before reaching their ultimate destination. Another is that FCC regulations require that copies of such messages handled by radio must be kept on file for at least a year. A third is that a standard form and procedure for message handling results in highest accuracy.

Before describing the standard amateur message form, it should be understood that message handling is a voluntary amateur service. Except in an emergency, no amateur is required to handle them. In case of an emergency, however, every amateur should know how to do so. Handling traffic is also an excellent way of improving one's code-copying ability and operating skill. More about these points later. Now to the standard message form.

The Standard Amateur Message Form

Nr 1 W9EGQ Ck 17 Gary, Indiana May 24 1953
To Mr. Robert Clark W9HUV
Route 11
Lafayette Indiana —...—
Thank you for sending me the pictures of your tornado damage stop I will return them soon
—...—Herb Brier

This message has four distinct parts. They are: Preamble, Address, Text, and Signature. All are important.

Preamble: The preamble should be complete. The number* and the date identify the message in the handling station's records, while the call letters and location identify the originating station. The check (Ck) is a count of the number of words in the text. Some operators also put the filing time of a message in the preamble.

* Messages may be numbered according to the originating station's preference. Some use an annual number sheet and others a daily numbering system.

Many operators omit the check. This is unfortunate, because it affords a rapid way to ascertain whether words have been accidentally added to or omitted from the text. Anyone who can count can check a message.

Other operators may omit the city of origin. Without it, an amateur would probably know that a message originated by W9EGQ came from Indiana, Illinois, or Wisconsin, or that one from KP6ABC came from Palmyra Island. Would the addressee?

Address: It must be complete. Unless a message can be delivered, there is no use sending it. John Jones, Wheatstone Bridge, Idaho, is not sufficient; neither is Pvt. Smith, C/O Postmaster, San Francisco. If available, a phone number, in addition to the regular address, often speeds delivery.

Text: The text is the reason for sending a message. It must be reasonably intelligible and say the same thing when it reaches the addressee as it did when it was written. Abbreviations have no place in it. Punctuation, if used, should be spelled out and counted in the check. Incidentally, I have news for those who think terms like "X-ray," and "X-ray

Jack Niemann, WN8MJH, and his 75-watt station at Fairview Park, Ohio. Receiver is an S-38C. Both a ½- and ¼-wave antenna are available. We have no information on the contents of the padlocked box.

initial" are recognized punctuation marks.

The text is set off from the address and signature with break signs (— . . . —), and every word between them is counted in the check.

Signature: Receiving a message without a signature is like reading a mystery story with the last chapter missing. You may suspect the guilty party, but you cannot be sure.

The Responsibility Of Stations Handling Traffic

It is the responsibility of the originating station to originate only worthwhile and complete messages. Subsequent handlers make no changes in messages received; they only see that these messages reach their destination promptly and exactly as written. Handlers should not hesitate to refuse garbled or incomplete ones. If, in this case traffic handlers would use more discretion fewer messages would end up in waste baskets or in the Dead Letter Office.

We have already stated, that, except in emergencies, any amateur is well within his rights to refuse messages for any reason that seems valid to him. Once accepted, however, every effort should be made to forward or deliver a message.

Probably the only excuse for refusing a message that instills a feeling of frustration in a traffic handler is for a station located a short distance from its destination to say something like, "Gee, OM, I'd like to help you, but I never hear a Ham on over there, so I don't know what I'd do with the message." A message can always be delivered by mail. They may be neatly written on a postal card or on special message cards or blanks that may be obtained quite reasonably from the various amateur supply houses.

Sending And Receiving Messages

Handling messages is made easy by a knowledge of standard procedures. Their heart is a few Q signals, plus certain abbreviations. The more important ones follow. Remember that a Q signal forms the question only when followed by a question mark.

QRU: I have nothing for you. Do you have anything for me?

QRV: I am ready. Are you ready?

QSL: I give you acknowledgment of receipt. Can you give me acknowledgment of receipt?

QSP: I will relay free of charge. Will you relay free of charge?

QTC: I have——telegrams for you (or for ——). How many telegrams have you to send?

?AA——: Repeat all after——.

?AB——: Repeat all before——.

?Adr: Repeat address.

?AI: Repeat all.

?Bn——and——: Repeat between——and ——.

?Sig: Repeat signature.

?Text: Repeat text.

?WA——: Repeat word after——.

?WB——: Repeat word before——.

C: Yes. N: No. R: Received.

? (IMI . . — — . .): Repeat.

The use of these Q signals and abbreviations is obvious.

An error in sending is corrected by sending the error sign (eight dots) or a single IMI, repeating the last correctly sent word, and continuing from there.

Break-in operation, which is the ability to change from receive to transmit merely by pressing the transmitting key, is the most convenient method of handling traffic. With it, a "fill" may be obtained immediately by pressing the key and requesting the desired repetition.

You do not have to be a high-speed operator to handle messages successfully. The important thing is accuracy. Do not guess. Be sure before sending R or QSL.

Originating Messages

There are no legal restrictions in the United States and its possessions on the type of messages that may be handled by amateur radio, though they must not be obscene. Amateurs are also prohibited from accepting compensation of any kind for handling messages.

Good judgment should be exercised in accepting

(Continued on page 54)

Ex-Novice station W9PQS Decatur, Illinois, operated b the Rev. Anthony J. Tamuli Ownership of a station such a this one is probably the drea of most Novices. Dream o Lads and Lassies.

MOBILE FANS . . . SEE LEO FIRST

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messages to be sent by amateur radio. We would certainly not encourage a business house to handle its correspondence via amateur radio. Too, it is normally unwise to originate urgent "rush" messages, such as death messages, for relay by amateur radio, when there are other means of communications available. There are just too many unavoidable chances for delay in delivery.

On the other hand, many traffic handlers believe that the unimportant "fair" messages ("Having a fine time at the sword-swallowers' convention. Wish you were here!"), that flood the traffic nets after certain fairs and amateur conventions, are seldom worth the trouble to handle. Once accepted, however, they should certainly be delivered.

At the present time, "morale" messages between men serving in the various branches of the armed services and their families form an important part of the messages amateurs handle. No great care is required in originating messages addressed to points in the United States, except to get a complete address. Messages to APO or FPO addresses, however, may be in a different category.

There may be only limited facilities, or none at all, for handling third-party messages at the remote point, or it may be difficult to deliver them. For these and similar reasons, it is usually better to let the initiative come from the remote end. If a message has been received via amateur radio from an APO or [illegible]dress, it is generally safe to accept a reply. This is also true where the soldier or sailor [illegible]ggested in a letter that amateur radiograms [illegible] sent to him. Otherwise, messages to such addresses should be accepted with the distinct understanding that delivery may be impossible.

Third-party messages to most foreign countries are strictly forbidden. The only exceptions are Canada, Chile, Ecuador, and Liberia, to which messages that would not normally be sent by any other means of communication may be sent.

Other Message Forms

Two modifications of the standard message form described earlier are occasionally met with in amateur circles. One is the "service" message, identified

Jim Rose (13) at the controls of his Novice station, KN2AZA, Hamburg, N. Y. That big grin is probably the result of thinking of all the pessimists who predicted that he would not be able to work anyone with his twenty watts and poor antenna. The QSL cards on the wall tell the story. Keep smiling, Jim.

Jim Tuggle, WN7SQQ, who operates this station in Portland, Oregon, gets double service from the post office. His mailman is W7EY. Besides bringing Jim his QSL cards, he also tuned up the transmitter to put more power into the antenna.

with SVC in the preamble in place of the check. It is addressed to the originator of a message that cannot be delivered, or about which additional information is needed:

Nr 1 W9EGQ SVC Gary, Ind. June 5, 1953
To W6VWT, Shell Beach, Calif. —...—
Ur nr 6 June 3 Mr. Henry Smith 104 Johnson St., Gary Ind., no such address —...— W9FGO

Upon receipt of this message, W6VWT would send the corrected address or cancel the message. Note that abbreviations are permissible in service messages.

The other variation is caused during the transmission of some messages in amateur channels which may have travelled part of their journey by means of MARS (Military Affiliate Radio System), in which a different message form is used. As the MARS member who transfers messages from one system to the other has the responsibility of putting them in the proper form, this introduces no complications in ordinary handling procedures. But if you should receive a message with a preamble similar to the following, you will know why:

Nr 12 K4USA Ck 10 Paris France via MARS
0300 June 10 ... ...

The words "via MARS" in this preamble are very important. Third-party messages of any kind between France and the United States by amateur radio are strictly forbidden, but are permitted via MARS to United States military personnel.

Letters And General News

My article on shortwave listener cards which appeared in the June issue has elicited a number of interesting comments. Whether the SWL should include return postage with his report cards or not seems to be the big problem. Bob, W6SUP, of Roseville, California, reports that they discussed it at their last club meeting. Seven of the eight amateurs in on the discussion thought that he should not.

Harold V. B. Voorhis, an SWL for over forty-five years, submitted some interesting figures on his percentage of replies to cards sent over a six-year period to foreign and United States amateurs. If I interpret them correctly, he found that his percentage of returns from USA did not increase sufficiently when he included return postage to make it economically attractive. However, he encloses an International Postal Reply coupon

(Continued on page 56)

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Gonset 3016 "Commander"

All-band Phone-CW transmitter for mobile use. Covers 1.7 to 54 mc. Supplied with 2 plug-in final coils which cover 80, 75, 40, 20, 15 and 11-10 meters. Up to 50 watts input on CW; 35 watts on phone. Use with [illegible] crystal or dynamic mike. Tubes: 6AG7 [illegible] With tubes, less crystal, mike and key. Requires 500 v. DC at 200-225 ma and 6.3 v. at 3.15 amps. 8 lbs.

98-041. *NET* **$124.50**

VFO MODEL 3020 TUNING HEAD [illegible]

98-042 *NET* **$29.95**

Gonset 3026 "Communicator"

Complete 2-meter Amateur phone station in portable case. *Transmitter*: AM phone; 5-7 watts output; takes crystal or carbon mike. Uses 8 mc crystals. RF Section 6CL6, 12AV7, 2E26, 9006 tuning eye rect. and 6E5 tuning eye. *Receiver*: Tunes 144-148 mc. Cascode RF stage, noise limiter; PM speaker; 6BQ7, 12AT7, 2—6BH6, 6BJ6, 6T8. *Receiver-Transmitter Tubes*: [illegible] With tubes [illegible] less mike and crystal. [illegible] For 110-120 v. 50-60 cycles AC or 6 v. DC. Shpg. wt. 24 lbs.

84-912. *NET* **$209.50**

Gonset 3040 "Super-ceive[illegible]"

For use with Gonset "Super-Six" (illustrated above but not supplied), Morrow, RME, etc. converters. Crystal-controlled, 4 double-tuned high Q 265 kc IF transformers, BFO with pitch control, separate AF and RF gain controls, noise clipper, built-in speaker. Adjustable squelch. Integral power supply, battery saving circuit. Separate control head for dash, under-seat or trunk mount [illegible] 6¾ x 5¼ x [illegible] cables and [illegible] crystal for [illegible] power supply [illegible] mounting [illegible] operation. 8 lbs.

84-914. First deliveries in October.

NET **$119.5[illegible]**

Gonset 3002 Converter

Provides continuous coverage from 3 to 30 mc in three ranges. Each range is spread over [illegible] to permit simple [illegible] Range A 3-[illegible] mc, Range B [illegible] Range C 18-30 mc. Has [illegible] dial. Power requirements: 10 ma at 135 volts and 6 volts [illegible] amp. 1500 kc output. Supplied complete with tubes, [illegible] and instructions. 5½ x 3½ x 5½". 5 lbs.

84-934. *NET* **$34.75**

Gonset 30[illegible] "Super-Six" Converter

Covers [illegible] 20, [illegible] 11-10 meter Ham bands—as well as 19 and 49 meter bands (for world-wide [illegible] broadcasts). Panel controls: [illegible] On-Off and Selector. Has RF [illegible] Oscillator Compensator, [illegible] Antenna Switch on rear panel. The Super-Six may be used with any [illegible] Supplied with tubes and cables. Housed in gray metal case, 5¼ x [illegible] Power requirements: 80-135 volts DC at 19 ma and 6 volts at 1 amp. 5 lbs.

84-913. *NET* **$52.50**

Gonset 3008 Converter

A sensitive 2 meter converter. Features super imposition tuning system—any 144-148 mc signal can be heard by tuning dial only 2 mc from 144-146 or 146-148 mc. Images from one half are heard simultaneously with fundamentals in other half. Eliminates all non-Amateur VHF images. Output frequency, 1 mc. Requires 135-2[illegible] volts DC 20 ma, 6 v. DC. With tubes, cables. 5½ x 5¼ x 5¾". 5 lbs.

84-926. *NET* .... **$44.5[illegible]**

Gonset [illegible] Clipper Noise Limiter

An easy to [illegible] noise limiter for any receiver with 2nd [illegible] AVC [illegible] audio in one tube. Eff[illegible] minimizes ignition noise, atmospheric [illegible] and other peak type interference. [illegible] designed for use with Gonset equipment [illegible] installations, but will improve [illegible] of any receiver. Size, 2 x 4 x 1[illegible]" Complete with [illegible] tube, cables and installation instructions. Shpg. wt., 2 lbs.

60-596. *NET* **$9.25**

3006 STEERING POST BRACKET. Mounting bracket for all Gonset converters. May also be adapted to mount any conventional mobile converter. Converter can be mounted on either side of steering post. With mounting straps and hardware. Shpg. wt., 1 lb. **84-994.** *NET* **$3.90**

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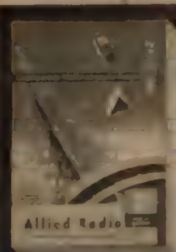

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(from page 54)

with each foreign card sent. He realizes a percentage return of fifty-seven from USA and forty-four from foreign cards.

Mort H. Schlesinger, another SWL, is violently opposed to enclosing postage. Instead, he encloses a completely filled in reply card, which needs only to be signed, stamped, and mailed by the amateur. He also nets about a fifty per cent return, which both he and Voorhis apparently consider satisfactory.

I think that it is significant that both have very attractive SWL cards and the reports they give indicate a desire to give the amateur valuable information in return for his QSL card. Voorhis's card for example is actually a four-page folder containing nine photographs!

Harold, W5WBU, writes, "Dear Herb, I have been a reader of the **Novice Shack** ever since I have been a Ham. My rig as a Novice was an **Eagle-X**, running about ten watts, and a **National SW-54** receiver. With this equipment I have had 1192 contacts in forty states.

"I am sixteen years old and will be a Senior in High School next year. Being the son of a Methodist minister, I would like to hear from the sons and daughters (hi) of other Methodist ministers. 73"—Harold Loden, W5WBU, Route 3, Carthage, Texas.

Bob, WN9UYE, says, "I use a **BC-457** on 80 meters and a **BC-458** on 40-meters. The receiver is a **BC-312**, with a **BC-453** as a "Q5-er." A strictly **surplus** shack, hi. I have been getting poor results from my ¼-wave, 80-meter antenna, so I am figuring on putting up that shortened ground-plane 80-meter antenna described in the November 1952 **CQ**. Right now, I'm working for my General Class license. Oh yes, I have worked twenty states. 73"—Bob, WN9UYE.

Another Bob, this time Bob, WN7TNF, had written to me while waiting for his license to arrive, perturbed by some reports that the **S-38** and **SW-54** receivers were useless as communications receivers. I reassured him that the reports were untrue. Now he writes again:

"Dear Herb, Though I have been on the air for two weeks, I have already worked three states with my thirty-two watts, **S-38**, and doublet antenna.. But the main purpose is to blow off steam. When a station gives you a RST569 report, and then says, 'Sorry OM, but the QRM is awful, but here's my address,' it really gets my goat. **(R5 is supposed to mean a signal is 100-per cent readable, with no difficulty; therefore it is not a true report of a signal, which is difficult to copy, because of interference—Herb.)**

"Also, I thought that when you worked a station, then you QSL'ed him, but it seems that the popular fancy is not to send a card until you receive one. I send a card to everyone I work, if I can get his address. Of course, some Hams do not have manufactured cards, which was my trouble until I brewed some of my own while waiting for the others.

"There! Now I feel better. 73"—Bob, WN7TNF.

Going north, we find VE1AEE, Nova Scotia, Canada. He writes, "Dear Herb, I enjoy the letters and General News each month in the **Novice Shack**. I am thirteen years old. Rig is a GAG7-6L6, running twenty watts input now. I did run thirty-five watts, until I blew a couple of filter condensers, hi. The receiver is an **RME-69**, and the antenna is a doublet, fed with lamp cord.

I have worked eight states, three confirmed, and five Canadian Provinces. The VO (Newfoundland) I worked was W4IGH/VO. I have never worked a WN, but I am looking forward to the day.

"I have some pen pals and am looking for more. 73"—George Roland, VE1AEE, 7 Vimy Road, Truro, Nova Scotia, Canada.

Those requesting help in obtaining their licenses this month are:

Larry English (13), Gifford, Idaho.

William Ress (13), 1200 Schuyler Drive, Derby, N.Y. Township of Highland On The Lake. Telephone Derby 4222.

Larry Abercrombie (16), 417 Arnold Road, East Peoria, Ill.

Don Metzger (15), Fon Du Lac Drive, East Peoria, Illinois.

T. G. Thompson, Box 347—New Addition, R.F.D. No. 1, Knoxville, Md. writes, "Dear Herb, Thanks for printing my request for help. So far, I have heard from one SWL and two amateurs, W9PTT and WN4YPY. Thanks to their help, I hope to go up for my General Class license in September.

(Continued on page 58)

(from page 56)

"The tips on sending SWL cards in this month's C were sure FB. 73"—Tom.

Dave, W1TUL, writes, "Dear Herb, I was glad to se in the May issue of CQ my letter regarding a teen-ag Ham club around Boston. I've gotten letters galore, an we have eleven members. We had applications printe and agreed to operate the club as a net on the 7-Mc an 145-Mc bands. We have our own version of a 145-M transmitter. 73"—Dave Yetman, W1TUL, 26 Hillsid Ave., Malden, Mass.

Also in the May column was printed a letter fro Earle Johnson, North Chicago, regarding the way som amateurs operate their mobiles. Paul WØBVO, Ceda Rapids, Iowa, agrees wholeheartedly. He reports tha while the Iowa Legislature was considering a bill t authorize call-letter license plates for amateurs, a ver irate reader of the Des Moines Register wrote to the Vo Pop page about how some recklessly-driving Ham with microphone in his hand had forced the writer's automobil off the road. The license-plate bill was defeated, an Paul believes that it was that letter that did it.

Ed, WN4WXL, writes, "Dear Herb, Low power wi get out! The secret is to have a good antenna, a goo fist, and patience. My rig runs ten watts to a 6V6, an the antenna is 130 feet long, fed with fifty-five feet twin lead. In eight months, I've contacted thirty-on states on 3.7- and 7.2 Mc. 73"—Ed, WN4WXL.

Fred, W4WKL, writes from Korea. "Dear Herb, Thank for printing the picture of my son, W4UVM, and myse in the April column. We get our magazines rather la here in Korea; therefore I just saw it.

"I have met many fellow Hams over here, but regula tions do not permit us to operate amateur stations. 73"— Fred, Sr., W4WKL.

Tom, WN4YOK, reports WL7AVP, Fairbanks, Alask as being on 7185 Kc., and wanting QSL cards from th Novices he works. His address is: Ray R. Allema WL7AVP, 74th Air Rescue Sq., Ladd A.F.B., APO 73 C/O Postmaster, Seattle, Wash.

Besides WL7AVK, Tom has worked forty states an VE3, with an Eldico TR-75 transmitter, and an NC-12 receiver. He has doublet antennas on 80 and 40 meter and a vertical on 40 meters.

Joe, W5TEL, writes, "Dear Herb, I notice that lots Novices have trouble with their antennas. So did until I put up a half-wave wire and fed it about thirty three feet from one end. With it, I worked 1500 mil with fifteen watts input. To find the best place to ta the feeder on the antenna, I put a Christmas-tree bulb the feeder and tapped the feeder on the antenna at th point that made the bulb light the brightest, 73"—Jo W5TEL.

(When using this antenna, it is necessary to have a goo ground connection for good results. Also, it is som what more likely to radiate harmonics than some oth types of antennas—Herb)

Bob, WN5YQO, also has a pet antenna. He has worke thirty-two states with powers ranging between twen and sixty watts. "I believe my good fortune is due to th use of a good antenna, The TF2D (CQ, February, 195 and proper loading. 73"—Bob, WN5YQO.

Jim, WN9WWJ, reports that there will soon be s Novices in a four-block area in Menominee, Wisc. The have organized a radio club, which they call the "QRM's

Louis Hoake, waiting for his call in San Diego, Cali met Russ, W6NNP, at a local radio store. While th were browsing around, they came across a carton th had stamped on it, "Don't throw—drop," which ga them both a chuckle.

Percy, WH6AWT, Hickam Air Force Base, APO 95 C/O Postmaster, San Francisco, Calif., reports, "My bi gest thrill in radio was my first contact. It was wi WH6AWU, who lives next door, hi! His fathe KH6AMY, taught us both. I have been interested amateur radio for a long time, but never thought I cou pass the test.

"Besides WH6AWU, I have worked California, Briti Columbia, Alaska, Texas, Nebraska, Illinois, and Mass chusetts! Rig runs seventy-five watts input. Receiv is an NC-100X. Antenna is a doublet. **(In his lett Percy said the antenna was forty-five high, but on h QSL card, he says it is eighty feet high. Take yo pick—Herb)**

"I work with Troop 97 of the Boy Scouts of America 400 of them. I hope to make them all Hams!!! Alread 150 of them come to watch me operate. 73"—Percy Beal, WH6AWT.

Once again, we have run out of room. See you ne month here. How about a letter or picture from y in the meantime? 73, Herb, W9EGQ.

DX AND THE SUN

(from page 21)

very similar to skip conditions on forty meters during the years of considerable solar activity.

One-Sixty:

Similar to what we have just discussed about eighty meters, conditions on one-sixty do not deteriorate with decreased solar activity. In fact, decreased ionospheric absorption will improve DX possibilities on this band. However, ionospheric absorption, even during the years of minimum solar activity, will still be strong enough to prohibit DX, except during the night-time hours of the Winter months. During these months, DX, although quite erratic, should be possible to may areas of the world. Improved conditions have already been noticed on this band, with a good number of European stations heard during the past Winter months with signals generally stronger than in past years.

Antennas:

With the general DX trend towards the lower frequencies, it is a good idea to make sure the antenna you are using on forty and eighty meters has characteristics that will enable signals to be radiated at the desired vertical angles of transmission. For DX transmissions, the optimum angles of radiation are generally considered to be between 5 and 20 degrees. The vertical angle of radiation is a function of antenna height above ground. To confine maximum radiation to the desired low angles, it is necessary for horizontal antennas to be placed at least a half-wave length high and preferably higher. At the higher frequencies, it is not too difficult to place antennas at these desired heights, since a half-wave length height at fifteen meters for example, is about 23 feet. However, at eighty meters, the desired height is at least 130 feet and for most of us it would be quite difficult to erect an antenna at this height. As an alternative, it is suggested that consideration be given to using vertical antennas for 40, 80 and 160-meter DX. A vertical antenna, even physically short ones*, are relatively good radiators at low angles. For DX, low-angle radiators are unbeatable.

Re-Cap:

This completes the analysis of DX possibilities during the next few years of minimum solar activity. The general trend will be towards the lower frequencies. The best band for daytime DX will be twenty meters, with night-time DX possibilities best on forty meters during the Spring, Summer and Fall months and on eighty meters during the Winter months. Band conditions are changing, but there will still be plenty of DX right through sunspot minimum—we will just have to look a bit harder for it, and in the right places.

---

* "How to Build on 80-Meter Midget Antenna"—Orr, CQ November, 1952; "A Broad Band 40-Meter Vertical"—Friends, QST October, 1952; "7-Mc. Beam For The Small Yard"—Mayo,fi QST September, 1952.

PROPAGATION CONDITIONS

(from page 43)

sun (see DX and the Sun, CQ, July and August, 1953), investigation continues for other ionization sources.

Eshlemen and Manning of Stanford University, California, delivered a series of papers describing the results of theirs and Peterson's (W6POH), and Villard's (W6QYT), work of determining of the effects upon shortwave radio of ionization produced by meteors entering the earth's atmosphere. Observations of meteor activity conducted in the Amateur 20-meter band indicates that ionization formed by these meteors may be responsible for extended range HF and VHF radio transmissions. They conclude that meteoric ionization can give an almost continuous signal, although at times extremely weak, despite the fact that at certain times, the frequency used may be considerably above the maximum usable frequency as conventionally determined for normal layer reflection. At VHF, scattering from meteor trails is believed to be at least an important contributing factor in propagation of high power signals well beyond the horizon. Application of communication systems specifically to this method of propagation may make it possible to conduct a continuous circuit of up to 800 miles, on frequencies in the upper HF and possibly lower VHF range, regardless of skip or MUF failure that are usually associated with the conventional ionospheric layers produced by the sun.

Propagation Predictions

Increased knowledge about the forces of nature that contribute to making long distance radio possible will permit increased accuracy in predicting the behavior of these forces and their effects upon radio waves.

At present, predictions of usable frequencies are based upon world-wide vertical soundings of the ionosphere. The application of this information to oblique circuits may often be the reason of disagreement between calculated and observed MUF's. Mr. Richard Silberstein described equipment recently built by the National Bureau of Standards which records MUF information for oblique ranges up to about 2000 miles. This equipment determines the MUF for a circuit by measuring the delay of the backscattered signal. While the equipment is still in its experimental stages, recent observations indicate that under ionospherically normal conditions, it can be used to determine oblique path MUF's. In addition, certain oblique ionospheric pulse experiments, also being conducted by the National Bureau of Standards, may eventually permit considerably more accurate predictions of usable frequencies for a circuit.

In its continuing efforts to improve the prediction of shortwave radio conditions, the RCA Laboratories Division has established an observatory at Rocky Point, Long Island, for conducting Solar Research. Dr. Miller, of RCA, described the equipment and some of the preliminary results of this program, including the accomplishment of photographing the sun in such fine detail that the granular characteristics of the face of the sun can be studied. It is believed that a study of these granular characteristics may eventually shed some light on the cause and nature of sunspots, and permit the eventual prediction of those ionospheric disturbances that occur at times when no sunspots are seen on the face of the sun.

Doctors' J. H. Rush and Walter Orr Roberts, of the High Altitude Observatory of Harvard University and the University of Colorado, described equipment they are using in their Solar Research program and their preliminary results in observing the atmosphere of the sun, called the **chromosphere.** They are investigating certain spike shaped flare-ups that occur in the chromosphere as possibly being a more accurate indication of ionospheric disturbances than are sunspots.

Leaving the sun for a while, Mr. J. H. Nelson of RCA Communications, Inc., New York, described methods used by him in achieving an 86% accuracy in short-term forecasts of propagation conditions for transatlantic radio paths. Mr. Nelson not only relies upon the conventional use of propagation data, sunspot observations and signal analysis, but also upon a system developed by himself—that of plotting the positions of certain Planets for determining the occurrence of ionospheric disturbances. While Mr. Nelson's system has as yet no scientific explanation, he has been able to show that when the planets make certain angular configurations with themselves, there is sometimes good, but not absolute, correla-

tion with ionospheric disturbances. Mr. Nelson has previously described the "Effects of Planetary Positions on Radio Signals," in March 1952 CQ.

We have learned a lot about radio propagation in the past thirty years, and it looks as if we'll know a lot more after another 30 years.

Next month, in addition to the regular **Propagation Charts** for September there will be included **Charts** centered on Europe, South America, Australasia, Far East and South Africa for the month of October.

This month's **Propagation Charts** are based upon a predicted smoothed sunspot number of 18 centered on August, 1953.

YL's FREQUENCY

high days. In three years at Hamming I have heard no YL's only 6 XYL's and all of them on phone. I would be most pleased to correspond with a YL around 14 or 15 years of age." Any gals interested, send your letter via your column editor.

Never Too Busy

A note from W3RYJ that W3UUD, Alice Kunnear, of Millis, Mass., was one of our busiest YL's she knew of, sounded intriguing. Seems Alice has seven jr. ops to care for, does all of her sewing, knits, delights in trying new recipes for cakes and cookies, *and* still finds time to operate on 160 and 75 phone, is a member of MARS, and checks into the Dog Net Monday through Friday.

But Alice is decidedly modest about it all. "Honestly," she says, "Esther gave me more credit than I deserve—it's just the routine any mother of a large family goes through. My sewing is down to making slips for the girls and PJ's for all the family—haven't checked too closely yet but have around 14 pairs to make before warm weather gets under way. (!!) Cooking of course goes on every day with four boys, ages 11, 10, 8 and 6, and three girls, 12 9 and 4 and they never stop eating!"

Alice says she's had her license only since July of '51, though her OM, W1DWO, has been licensed since before she met him. It was Hamming that brought them together. Lloyd called one day with a message from a friend in New Jersey. Then he invited Alice's family to come to his shack to talk to their friends. About two years later Lloyd and Alice were married.

In addition to 160 and 75, Alice can work on 40 meters. She generally runs 75 watts to a pair of 35T's with a 1625 in the modulator, though she can push it up to about 160 watts when things get "tough." She says at present Lloyd is working on a beer-can vertical antenna for 40. To get the cans they gave two beer parties last year for Ham friends, one in May and another in October, and Alice says that her OM is satisfied with the progress he has made. (Any more parties coming up? Hi!)

They also have a small rig in the car, running 3 watts of power. Says they get wonderful reports with it, having worked into VE1, 2 and 3. Recently when W1UET, Martha, visited Alice they drove to Newport, R.I. (Alice's home town) and from there they worked W1RLS at Newport, Vt., with the 3 watts for a solid contact.

Alice's other hobby is collecting photographs of

(Continued on next page)

(from page 61)

the Hams she has worked. To date she has over a hundred pix, and says she'll be glad to exchange photos with anyone she works. Sorry we don't have a photo of Alice. She tells us those she has are "unprintable" (?)—you'll just have to have a QSO with her if you want to see her picture.

33, es CUL—W5RZJ

SINGLE SIDEBAND

(from page 26)

level of the two tones until the system starts to overload—that is evident by flattening of the peaks of the pattern as shown in *Fig. 4*. If this point of *maximum linear input* is considerably less than the final amplifier is capable of, you should determine if the loading on the final is heavy enough, or if the driver stage is over-loading before the final reaches its maximum grid driving requirements. A quick test for light loading is to throw the final plate tank circuit slightly off resonance and watch the pattern. If the flattening disappears as the 'scope pattern decreases slightly in amplitude the final is not loaded heavily enough and the proper steps must be taken to increase the antenna coupling. However, if the flattening remains the trouble is in the driver or the coupling arrangement between driver and final. Slightly tighter coupling beteween stages or at least more efficient coupling must be accomplished.

If your 'scope pattern looks like *Fig. 5*, your trouble is something else. Your grid bias is too high and must be reduced until the two sine wave patterns cross the center-line with perfect sharp "X" patterns. This type of distortion is present at *all levels* of signal input and has been nicknamed "cross-over distortion" by the boys. Reducing the gain when operating the transmitter on the air will do little to clean up this latter type of distortion. Gain reduction would, however, help the peak-flattening distortion mentioned first. Don't reduce your operating bias to the point where your tubes are dissipating more than their ratings call for. There are occasional cases where you just can't arrive at a satisfactory bias with the rated tube dissipation. The author has occasionally had this trouble with some surplus 807's, but, fortunately, this has been rare.

This is by no means the last word on the two-tone test. For more extensive tests and information I recommend that you read the fine pair of articles by Long[3] and Ehrlich[4]. They are very well written and include material that it is impossible to

(Continued on page 64)

3 "Sugar Coated Linear-Amplifier Theory," Long, QST, Oct., 1951, p. 22.
4 "How to Test and Align a Linear Amplifier," Ehrlich, QST, May, 1952, p. 39.

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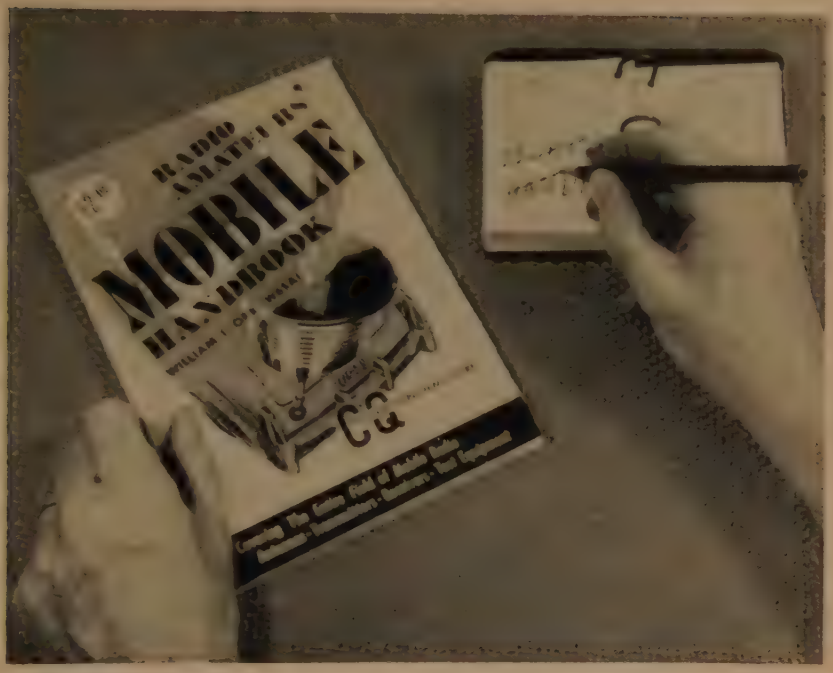

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CQ MAGAZINE CQ-8
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Enclosed find $ for copie(s) of the Radio Amateurs' MOBILE Handbook at $2.00 each.

Name ..... Call .....

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City ..... Zone ..... State .....

(from page 63)

cover here for reasons of space.

The 6146 Final Amplifier

Using the values we arrived at in the design par of this article, we are now in a position to build an amplifier. *Figure 6* shows the push-pull arrange ment and *Fig. 7* shows the parallel-connected cir cuit. It is up to the individual preference which circuit is to be used. Care should be taken to isolate the grid and plate circuits. The best policy is to keep the grid circuits below the chassis and the plate circuit components above the chassis. How ever, if plug-in coils are to be used, the grid tank coil should be isolated by a large chassis shield or totally enclosed in a shield can or box. If these precautions are taken, neutralization should not be necessary. Use of plenty of ceramic bypass con densers is recommended wherever possible.

I know some of you are wondering about using the tubes at higher plate voltage, for example 120 to 1500 volts. As explained in *Part I* of this series this will cause the peak power to be quadrupled and because of the low duty-cycle of human speech the average plate dissipation of the tubes will not be exceeded.

There are certain precautions that must be ob served when the plate voltage is raised, however In the particular case in question, the screen voltag should be lowered to 150 volts (regulated, o course), and the grid bias voltage must be raise until the no-signal plate dissipation is again abou half of rated maximum. When operating th amplifier under these conditions, you will have to b especially careful not to abuse the tubes by whistlin into the microphone for more than a *very* shor time. Also, if carrier insertion is used, keep th stage operating at greatly reduced continuous level so that the plates will not blush—not even a little Two-tone tests cannot be generally made at fu input except for very short periods because of th high average power involved. Under normal voic inputs, however, you will find that you can get ap proximately 400 watts peak sideband power outpu with 1500 volts on the plates. This is quite a signa for such a small package.

That's the story, dear reader. You now hav enough information to set up a medium-power SS station and to operate it. For those who want t go "whole hog" and develop a full kilowatt single sideband *Part VI* of this series will give som pointers and work through the necessary steps fo "the full treatment." Remember—one man's linea is another man's clear channel.

BIBLIOGRAPHY

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1. "On the Air with Single Sideband," QST, Feb., 195 p. 51.
2. "On the Air with Single Sideband," QST, Apr., 195 p. 51.

Grounded-Cathode Amplifiers
1. "Power Peaker," Norgaard, GE Ham News, Sept.-Oc 1952.
2. "A Two-Stage Linear R.F. Amplifier," Goodman, QS March, 1951, p. 13.
3. "Lazy Linear," Norgaard, GE Ham News, July-Augu 1949.

51 RTTY Stations Copy Armed Forces Day B'cast

Armed Forces Day found WWV announcing W-2 (very poor) conditions. In spite of this, a very creditable showing was made by amateurs who copied the radioteletypewriter broadcasts.

The broadcast from NDC, Norfolk, Va., was copied by K1NAI, W1UDX; W2's K1D, SKK, TFT, WCE; W4's MOP, NIS, ZC; K4NRY; K5NRL; W8's BYB, NTE, and W9's AKP, TCJ. Of these, W2WCE, W4MOP, and W4ZC made perfect copy.

NDS, Great Lakes, Ill., was copied by W2's JAV, KLD, PAT, PAU; K2NRS; W3's PYW, USA; K4NRY; W4OLL; W5USN; K5NRL; K5AIR; W9's GRW, TCJ, THE; and WO's CIH, QHG. Of these, K5NRL, W9GRW, W9TCJ, and W9THE made perfect copy.

Ten stations copied NDW2, Salt Lake City, Utah. Apparently this station was not adjusted for standard shift. However, W6ITH, W6PQ, K6USN, and K6USA made perfect copy and the following made readable copy: W6CLW, W6FLW, W6LIJ 7, W6YDK, K7NRL and W7LVL.

Conditions on the West Coast appeared to be fairly good; nine stations submitted perfect copy of the broadcast from NDW, San Francisco, California. These were W6's BV, DOU, EV, FCS, ITH, KY, NSS, OWP, ZH. Good copy was submitted by W6TAC/6, W6's AEE, CLW, FLW, NYF, SCQ, and W7LQC, W7GPR.

The message used in the radioteletypewriter broadcasts was as follows:

"IT IS ESSENTIAL TO THE NATIONAL DEFENSE THAT RADIOTELETYPE CIRCUITS ACHIEVE A DEGREE OF RELIABILITY AT LEAST EQUAL TO THAT OF RADIOTELEGRAPH X AN IMPORTANT FACTOR IN ACHIEVING THIS RELIABILITY IS A SOURCE OF PERSONNEL WHO ARE FAMILIAR WITH THE TECHNIQUES AND EQUIPMENTS USED IN RADIOTELETYPE COMMUNICATIONS X WITHIN THE LAST FEW YEARS THERE HAS BEEN A GROWING INTEREST IN RADIOTELETYPE FOR AMATEUR RADIO COMMUNICATION X THE INDIVIDUAL AMATEUR HAS PROVED THAT THE SKILL AND KNOWLEDGE GAINED FROM THE PURSUIT OF HIS HOBBY STAND HIM IN GOOD STEAD IN BOTH INDUSTRY AND IN MILITARY SERVICE X WHILE THE NUMBER OF AMATEURS WHO ARE ABLE TO COPY THIS MESSAGE IS COMPARATIVELY SMALL COMMA THE RECENT ACTION OF THE FEDERAL COMMUNICATIONS COMMISSION COMMA IN OPENING ADDITIONAL AMATEUR BANDS TO FREQUENCY SHIFT KEYED TRANSMISSION COMMA HAS PROVIDED A NEW OPPORTUNITY FOR AMATEUR ACTIVITY X

(Continued on next page)

(from page 65)

WE ARE CONFIDENT THAT RADIO AMATEURS WILL MEET THIS OPPORTUNITY WITH THEIR USUAL ENTHUSIASM COMMA ENERGY COMMA AND INGENUITY X GEORGE I BACK MAJOR GENERAL USA CHIEF SIGNAL OFFICER W B AMMON REAR ADMIRAL USN DIRECTOR NAVAL COMMUNICATIONS GORDON A BLAKE BRIGADIER GENERAL USAF DIRECTOR OF COMMUNICATIONS"

The test of the message was the same for all transmitting stations except that the word "MAJOR," in Major General Back's title, was transmitted "MJOR" by NDC, and the word "opportunity" was transmitted "oportunity" in one portion of the broadcast from NDW2.

An interesting feature was reported by W6CMQ. Official duties in the Navy prevented him from participating in reception of the broadcasts in the HF band. However, the text of the broadcasts was relayed to him by W6CLW on 147.85 Mc. This VHF transmission was received during his absence on "automatic start" equipment. W6CMQ states, "This equipment is common in the Los Angeles area. The reception of the Armed Forces Day test message by this means indicates another phase of amateur preparedness to meet emergency communication requirements."

DX NEWS

(from page 50)

LX1JW . . . ZS6KD visited W1NWO and W1ATE . . . SU5EB now signs MD5EB.

21 Mc.

Conditions were poor during June, with short skip prevailing in most areas . . . VK4FJ is up to 36 while ZC4IP made it 26 with VK9GW on this band . . . FA8IH went to 59 with ZS9I, KZ5IL and EA9AP . . . W6ZZ upped to 43 with CO2CY . . . LU5AQ confirms the following LU 21-Mc assignments: 21,000/21,150 A1 only, 21,150/21,225 A1/A3, 21,225/21,450 A3 only . . . ZS2AT has 49 on 21 Mc . . . KP4KD went to 56 with YN1AA . . . VK4EL reports W6AL as the most consistent W out his way and says that HP3FL, Frank, is always S9 even on a dead band! . . . W6SAI nabbed VQ4DO for No. 22 . . . Newcomers on this band have been SP6XA, EA9AP and LZ1KAB.

73, KV4AA.

KV4AA HAS JUST RECEIVED A BATCH REVISED COUNTRY/ZONE FORMS FOR HONOR-ROLL/WAZ LISTINGS. WE WILL BE GLAD TO FORWARD THESE FORMS TO ANY STATION REQUESTING SAME. TO THOSE WHO HAVE REQUESTED THESE FORMS IN THE PAST PLEASE RE-SUBMIT VIA POSTCARD.

Things to Come

This "ultimate" in mobile receiving equipment is scheduled for appearance as a feature article in CQ. With the exception of the CW noise limiter, this little receiver (only 4⅛" x 7⅝" x 12¾") packs all the punch of the standard 75A-2.

Look to CQ, the Ham Magazine which forms an essential part of the life of the well-oriented Radio Amateur. In striving to provide the foremost material on all phases of Amateur Radio, CQ has enlisted the talents of the top authors and designers in the field today. Subscribers of CQ are thereby assured of being "in" on any development that results in the improved performance of their Ham gear—either on the road or in the home QTH. Why not subscribe today?

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CQ Magazine 67 West 44th Street New York 36, N. Y.

CW SECTION RESULTS

CQ's 1952 DX CONTEST

(from page 35)

Single Operator Stations

Africa

Mauritius					
14 Mc.	VQ8AF	9—	12—		651
Portuguese Guinea					
14 Mc.	CR5AC	10—	8—		1,764
South Africa					
All Bands	ZS6OW	59—	117—	283,712	
	ZS2HI	36—	62—	71,334	
3.5 Mc.	ZS6OW	7—	9—	672	
7 Mc.	ZS6OW	10—	24—	14,110	
	ZS2HI	11—	15—	8,811	
14 Mc.	ZS6OW	24—	52—	71,440	
	ZS2HL	25—	47—	28,872	
	ZS6RB	5—	3—	792	
21 Mc.	ZS6OW	12—	23—	6,265	
28 Mc.	ZS6OW	6—	9—	540	
Southern Rhodesia					
All Bands	ZE3JP	50—	94—	210,960	
	ZE3JO	22—	29—	5,100	
3.5 Mc.	ZE3JP	1—	1—	2	
7 Mc.	ZE3JP	14—	29—	20,296	
	ZE3JO	4—	4—	64	
14 Mc.	ZE3JP	21—	54—	27,775	
	ZE3JO	10—	14—	1,128	
21 Mc.	ZE3JP	14—	30—	21,428	
	ZE3JO	6—	7—	351	
28 Mc.	ZE3JO	2—	4—	108	
Southwest Africa					
14 Mc.	ZS3S	14—	16—	1,950	
Sudan					
14 Mc.	ST2HK	9—	23—	3,680	

Asia

	Station	Zones	Countries	Score
Bahrein Island				
14 Mc.	MP4BBD	12—	22—	9,214
Ceylon				
All Bands	VS7NG	23—	34—	11,001
Cyprus				
All Bands	ZC4IP	31—	86—	139,698
Hong Kong				
All Bands	VS6CG	24—	39—	30,555
7 Mc.	VS6CG	5—	6—	1,056
14 Mc.	VS6CG	19—	33—	20,228
	VS6AE	16—	21—	7,918
	VS6CI	7—	7—	1,232
Israel				
All Bands	4X4RE	70—	180—	577,250
	4X4BX	64—	172—	422,676
3.5 Mc	4X4RE	6—	19—	3,950
	4X4BX	5—	22—	2,835
7 Mc.	4X4BX	19—	53—	52,056
	4X4RE	17—	53—	48,790
14 Mc.	4X4RE	24—	62—	94,514
	4X4BX	23—	58—	56,538
	4X4CL	8—	25—	8,613
21 Mc.	4X4RE	17—	33—	15,050
	4X4BX	11—	22—	6,567
28 Mc.	4X4BX	6—	17—	1,518
	4X4RE	6—	13—	1,026
Japan				
14 Mc.	KA9AA	20—	28—	22,896
	JA1AB	16—	19—	7,455
	JA1AF	14—	17—	6,510
	JA1AM	7—	7—	490

Oceania

Australia

All Bands	VK2GW	32—	49—	43,821
	VK3XK	32—	47—	39,648
	VK3PG	15—	18—	5,412
	VK7LZ	12—	12—	864
3.5 Mc.	VK2GW	1—	1—	14
	VK3XK	2—	2—	8
7 Mc.	VK3XK	9—	10—	4,845
	VK2GW	10—	14—	4,704
	VK3HT	9—	9—	1,998
	VK6SA	4—	2—	720
	VK7LZ	7—	6—	351
14 Mc.	VK2GW	15—	28—	12,814
	VK3XK	17—	30—	10,246
	VK3CX	17—	14—	3,100
	VK3PG	10—	9—	2,109
	VK3HL	11—	14—	1,450
	VK7LZ	3—	3—	30
21 Mc.	VK4FJ	10—	12—	2,244
	VK3PG	5—	9—	742
	VK2GW	6—	8—	480
	VK3XK	4—	5—	242
	VK7LZ	2—	3—	20

Fiji Islands

All Bands	VR2CG	50—	66—	95,920

Hawaii

All Bands	KH6IJ	63—	83—	283,094
	KH6MG	57—	60—	144,378
	KH6PM	18—	18—	14,724
3.5 Mc.	KH6IJ	5—	5—	1,410
	KH6MG	4—	4—	912
7 Mc.	KH6IJ	16—	24—	28,320
	KH6PM	15—	17—	12,128
	KH6MG	13—	27—	6,129
	KH6AJP	8—	9—	1,496
14 Mc.	KH6LG	23—	36—	49,678
	KH6IJ	24—	37—	47,946
	KH6MG	21—	24—	29,520
27 Mc.	KH6IJ	12—	13—	6,925
	KH6MG	8—	8—	3,072
	KH6PM	3—	1—	120
28 Mc.	KH6MG	11—	10—	945
	KH6IJ	6—	4—	270

Marshall Islands

All Bands	KX6AI	35—	49—	68,376

New Hebrides

All Bands	YJ1AB	13—	14—	3,834

New Zealand

All Bands	ZL1MQ	44—	52—	55,200
	ZL2GS	38—	51—	49,128
	ZL4BO	29—	33—	9,920
3.5 Mc.	ZL4BO	7—	11—	646
	ZL1MQ	5—	8—	312
7 Mc.	ZL2MM	10—	10—	4,440
	ZL2GS	7—	5—	1,896
	ZL1MQ	8—	7—	1,545
14 Mc.	ZL2GS	21—	36—	16,074
	ZL2GX	20—	32—	15,652
	ZL1MQ	18—	25—	12,728
	ZL1RD	17—	24—	8,897
	ZL3CP	18—	27—	8,145
	ZL4BO	15—	14—	2,668
	ZL1QW	15—	16—	2,139
	ZL1HY	3—	4—	84
21 Mc.	ZL1MQ	9—	9—	2,610
	ZL2GS	10—	10—	2,240
	ZL3EA	6—	6—	816
	ZL4BO	7—	8—	480
	ZL1HY	3—	1—	144
28 Mc.	ZL1MQ	4—	3—	49
	ZL1HY	2—	3—	25

Niue Island

All Bands	ZK2AA	30—	33—	31,752

Thanks to the following stations for submitting check logs.

VP7NM	DL4LQ	VP6AF
F3HK	W6EJA	W8HUD
GI4RY	LU4DMG	W3JSH
OH7OR	W6AL	VK3VQ
W4PHJ	VE3BDB	KL7PL
W6HPB		VE3ADV

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ELDICO TR-1 300-watt $225. SX-71 $175. Both perfect W6FXV, 2722 University, Fresno, Calif.

GETTIN' OLD. Wanna sleep, and in a bed again. Ham equipment clearance. Dreamstuff, new/used, collectors items, Novice "buys," spares, junk. Ten-page typed list 25c. W2RUT, 803 Forest, Fulton, New York.

COLLINS 32V-2, 50 hours, excellent condition, spare 4D32 and others, D-104 mike, manual $500; 75A-2, F1 adaptor, 25 hours new condition, manual $360; BC-348 a. c., hot and clean, $65; BC-314D tunes 150-1500 kc. i 4 bands, a.c. conversion almost complete, clean, manua $40; BC-946 broadcast tuner, new $30; BC-696 used un converted $15; BC-457, BC-458 $5 each; BC-453, $15 BC-454, BC-455 $7.50 each; BC-221 built-in power suppl complete, good condition, $60; 2 new 807-W $5 each. A FOB. Will pack and ship. Transferred, need money Keel, WØNEN, 6001 Cottage Drive, Des Moines, Iowa

FREE LIST. Used Collins, Elmac, Hallicrafters, Ham marlund, Harvey-Wells, Lysco, National, RME, Sonar etc. Lowest prices. Liberal trades. Dossett W9BHV 855 Burlington, Frankfort, Indiana.

BARGAINS: New and reconditioned Collins, Hallicraf ers, National, Hammarlund, Johnson, Elmac, Harvey Wells, Gonset, Morrow, Babcock, RME, Millen, Lysco others. Reconditioned S53A $49; S40A $69; S40B $79 SX43 $119; S76 $129; SX42 $179; NC173 $149; NC18 $199; NC125 $129; HF-10-20 $49; VHF152 $49; VHF152 $59; RME45 $89; HQ129X, SP400X, SX71, NC240I HRO50T1, NC183D, HRO60, Viking I, Collins 75A 75A2, 32V1, 32V2, HT9, many others. Shipped on tria Terms. List free. Henry Radio, Butler, Mo.

SELLING OUT: Hammarlund HQ-129X receiver, guaranteed like new, $175; New Meissner EX signal shifte $75; 1600-volt 350-ma power supply $50; 500-watt P 813 final amplifier with tubes, meters, fil. xfmrs an coils $55; 125-watt modulator $58; D-104 mike $10; 40 watt phone CW TVI-proof xmtr with VFO all band $225. R. E. Queen, Route #7, Spartanburg, S. Car.

ELMAC XMTR 40-meter band with 110 v. power supp including plate and recv'r-disabling relays interconnec ing cable and push-to-talk carbon mike. Act quickl the works $125. Major H. S. Wilson, W6CSF/4, Hq 7 Radio Relay Squadron, Robins AFB, Georgia.

FOR SALE: SX24 receiver without speaker, $65; pa BC-322 walkie-talkies complete with new batteries 52-Mc. $25 each; BC654 new condition $30; WØWTP Ji Anderson, Rt. 4, Austin, Minnesota.

SELLING OUT: Complete station HT-9, HT-18 VF HRO5TA1, Ereco heavy-duty beam rotator and directi indicator, 10-meter beam, mike, spare tubes, co-ax et Best offer over $350. K2BKS, 65 Yorkshire Drive, Ced Grove, New Jersey, Tel: VE-8-2244J.

FOR SALE: BC610E with BC614E speech amplifie factory converted for 10 meters. Excellent conditio never tampered with. Spare 250TH and pair 100TH coils 80 thru 10 meters. $550. FOB, Cleveland, Oh All inquiries answered. Jack Goldfarb, W8WGO, 35 Cedarbrook Road, Cleveland, 18, Ohio.

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FOR SALE: Collins 32V-2, perfect, with spare 4D3 other spare tubes. $500. W7AOD, 17406 4th Ave. S.W Seattle 66, Wash.

SELL: Globe King, top shape, unmodified A model wi coils. Will deliver 100-200 miles from Shreveport. $2 W2BKV/5, P.O. Box 507, Barksdale AFB, Shreveport, L